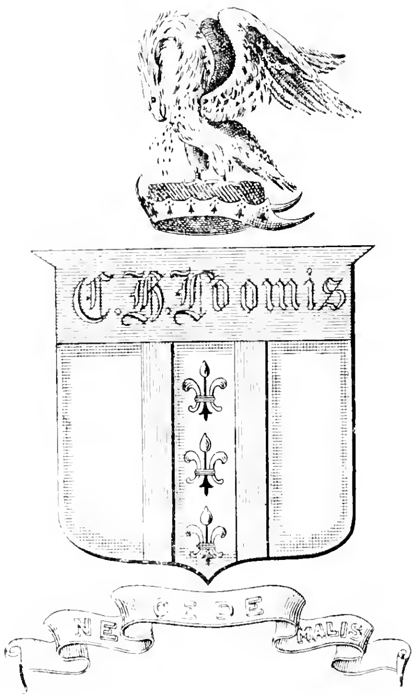
SCIENCE GOSSIP.


C. H. Loomis
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HARDWICKE'S

SCIENCE-GOSSIP

FOR 1868.

HARDWICKE'S

Science-Gossip:

AN ILLUSTRATED MEDIUM OF INTERCHANGE AND GOSSIP

FOR STUDENTS AND

LOVERS OF NATURE.

EDITED BY M. C. COOKE,

AUTHOR OF "A PLAIN AND EASY ACCOUNT OF THE BRITISH FUNGI," "MICROSCOPIC FUNGI,"
"A MANUAL OF BOTANICAL TERMS," AND OF "STRUCTURAL BOTANY,"
THE "BRITISH REPTILES," ETC. ETC.

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OUR COMPLIMENTS TO OUR READERS.

THE completion of our Fourth Volume with the issue of this forty-eighth Number, gives us an opportunity, which we cannot afford to lose, of saying a few words to our friends and supporters. When our first Number made its appearance it was almost alone amongst periodicals devoted to popular Natural History: since that period several others have been commenced. To us this is a source of gratification, and by no means one of regret: there is room enough for all. The increase of journals and the widening influence of Natural History pursuits, have apparently kept pace with each other; whilst our own has steadily and progressively found its way into the remote corners of the world, almost wherever the English language is spoken, and never shown a tendency to fall back from the eminence it attained at the first.

If we may judge from the opinions expressed, not only by our correspondents but by scientific men with whom we have come in contact, a steady and continuous improvement has characterized our "Gossip" from its first to its forty-eighth number. If this be true, and we believe it is, it promises well also for the future. The spirit of progress bids us hope.

The occasional hints and suggestions we receive are evidence of the interest which many of our correspondents possess in our success. Of course we cannot adopt all the suggestions, but they may often have a salutary influence. Those who urge us to be less gossiping and more technical, or as it is sometimes phrased, "take a higher standing," undoubtedly mean well, but they altogether mistake what we are fain to regard as our "mission." It is not our object or ambition to become what is called a "scientific journal." Ours is a "Gossip," and it is our aim to gossip freely, in as untechnical a manner as possible, on

scientific subjects, so that even those of our readers who have not had a scientific training, who have no systematic knowledge of Zoology or Botany, or the cognate sciences, and who have no adequate leisure for such pursuits, may read with pleasure and understanding.

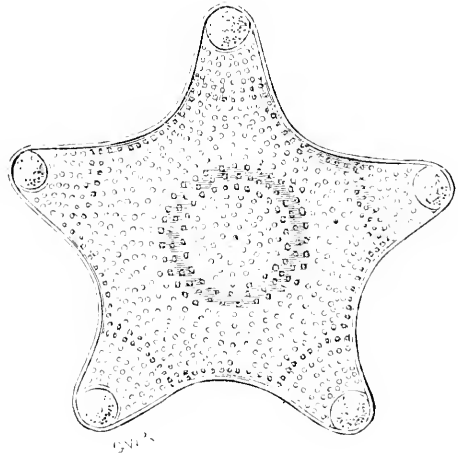
Those who complain, on the other hand, that we have a tendency to become too scientific, we always listen to with respect; it is, we are well aware, the greatest of all our dangers, and needs constant effort to control. Literally we cannot be too scientific, if by that is meant the truth of science; but it is quite possible to communicate truth in common-place language, free from technicalities, or too close a regard for minute specific distinctions. Men who are accustomed to address their remarks to coadjutors acquainted with their phraseology, accustomed to technicalities, to terse descriptions, to rigid accuracy in definition, are apt to forget themselves in addressing a non-scientific public, and to take too much for granted. Far be it from us to condemn the technicalities of science, or to underrate the value of terse and accurate description in communications between men of science, but to gossip with the outside world is quite another thing.

This public opportunity for thanking our numerous contributors for their help in the past, and for soliciting their future aid, must also be accompanied by thanks equally hearty, in which many of our correspondents will also join, to those gentlemen who have so kindly in their various branches of science answered queries, named specimens, and otherwise assisted us and them, and contributed much to our success.

Finally, we promise for the future to do our best still to merit the support and congratulations of our readers, so that year by year, as we wish for them, so they may wish for us,—

"A Happy New Year!"

LIST OF ILLUSTRATIONS.



THE AGRICULTURAL ANT OF TEXAS.

(*Myrmica molefaciens.*)*

By Dr. GIDEON LINCECUM.

THIS is inodorous, having no smell of formic acid. It is a large reddish-brown ant, dwells in the ground, is a farmer, lives in communities, which are often very populous, and controlled by a perfect government; there are no idlers amongst them. They build paved cities, construct roads, and sustain a large military force.

When one of the young queens, or mother ants, comes to maturity, and has received the embraces of the male ant, who immediately dies, she goes out alone, selects a location, and goes rapidly to work excavating a hole in the ground, digging and carrying out the dirt with her mouth. As soon as she has progressed far enough for her wings to strike against the sides of the hole, she deliberately cuts them off. She now, without further obstruction, continues to deepen the hole to the depth of 6 or 7 inches, when she widens the bottom of it into a suitable cell for depositing her eggs and nurturing the young. She continues to labour outdoors and in, until she has raised to maturity 20 to 30 workers, when her labour ceases, and she remains in the cells, supplying the eggs for coming millions, and her kingdom has commenced. But very few of the thousands of mother ants that swarm out from the different kingdoms two or three times a year succeed in establishing a city. However, when one does succeed in rearing a sufficient number of workers to carry on the business, she entrusts the management of the national works to them, and is seen no more outside.

The workers all seem to understand the duties assigned to them, and will perform them or die in the effort.

The workers increase the concealment, which had been kept by the mother ant during the period of her personal labours, of the passage or gateway to their city by dragging up and covering it with bits of stick, straw, and the hard black pellets of earth which are thrown up by the earthworms, until there is no way visible for them to enter; and the little litter is so ingeniously placed, that it has more the appearance of having been drifted together by the wind than to have been the work of design.

In about a year and a half, when the numbers of the community have greatly increased, and they feel able to sustain themselves among the surrounding nations, they throw off their concealment, clear away the grass, herbage, and other litter to the distance of 3 or 4 feet around the entrance to their city, construct a pavement, organize an efficient police, and, thus established, proclaim themselves an independent city. The pavement, which is always kept very clean, consists of a pretty hard crust about half an inch thick, and is formed by selecting and laying such grits and particles of sand as will fit closely over the entire surface. This is the case in sandy soil, where they can procure coarse sand and grit for the purpose, but in the black prairie soil, where there is no sand, they construct the pavement by levelling and smoothing the surface, and suffering it to bake in the sunshine, when it becomes very hard and firm. That both forms of these pavements are the work of a well-planned design, there can be no doubt with the careful investigator. All the communities of this

* See Proceedings of the Academy of Sciences, Philadelphia, 1866, p. 323, for further particulars.

species select their homes in the open sunshine, and construct pavements. Their pavements are always circular, and constructed pretty much on the same plan. During the ten years' drought that prevailed here, and which seemed very favourable to the increase of this species of ant, they suffered their pavements to remain flat, sometimes even basin-form. But the drought could not continue always. The rain, which would be certain to drown the ants should it come upon their flat and basin-form pavements, would return again some day, and they seemed to know when this much-dreaded event would occur. At least six months previous to the coming of the rain, they commenced, universally, building up mounds in the centre of the pavements. To these mounds in the prairie they brought the little pellets of earth thrown to the surface by the earth-worms, and piled them up into a circular mound a foot or more in height. In sandy soil it is constructed of coarse sand, and in rocky situations they build it of gravel, and the pieces are so large, and the mound so high (18 inches to 2 feet, with a 4 feet base) that the beholder is overwhelmed with wonder. I know of one of these stone pyramids nearly 3 feet high, and 5½ to 6 feet base, in which there are many little fragments of stone, some of them carried to the very top, any one of which would weigh more than 25 ants. Internally, the ant mound contains many neatly constructed cells, the floors of which are horizontal; and into these cells the eggs, young ones, and their stores of grain are carried in time of rainy seasons.

The mound itself, and the surface of the ground around it, to the distance of 4 or 5 feet, sometimes more, from the centre, is kept very clean, *like a pavement*. Everything that happens to be dropped upon the pavement is cut to pieces and carried away. The largest dropping from the cows will, in a short time, be removed. I have placed a large corn-stalk on the pavement, and in the course of two or three days found it hollowed out to a mere shell; that too, in a short time, would be cut to pieces and carried off. Not a green thing is suffered to grow on the pavement, with the exception of a single specimen of grain-bearing grass (Aristida stricta). This the ant nurses and cultivates with great care; having it in a circle around, and 2 or 3 feet from the centre of the mound. It also clears away the weeds and other grasses all around outside of the circular row of Aristida, to the distance of 1 or 2 feet. The cultivated grass flourishes luxuriantly, producing a heavy crop of small, white, flinty grains, which under the microscope have the appearance of the rice of commerce. When it is ripe it is harvested by the workers, and carried, chaff and all, into the granary cells, where it is divested of the chaff, which is immediately taken out and thrown beyond the limits of the pavement, always to the lee side. The clean grain is carefully stored away in dry cells. These cells are so constructed that water cannot reach them, except in long wet spells, when the earth becomes thoroughly saturated, and dissolves the cement with which the granary cells are made tight. This is a great calamity, and if rain continues a few days it will drown out the entire community. In cases, however, where it has continued long enough only to wet and swell their grain, as soon as a sunny day occurs, they take it all out, and spreading it in a clean place, after it has sunned a day or two, or is fully dry, they take it in again, except the grains that are sprouted; these they invariably leave out. I have seen at least a quart of sprouted seeds left out at one place.

They also collect the grain from several other species of grass, as well as seed from many kinds of herbaceous plants. They like almost any kind of seeds—red pepper seeds seem to be a favourite with them.

In a barren rocky place in a wheat-field, a few days after harvest, I saw quite a number of wheat grains scattered over the pavement of an ant city, and the labourers were still bringing it out. I found the wheat quite sound, but a little swelled. In the evening of the same day I passed there again; the wheat had dried, and they were busily engaged carrying it in again.

The species of grass they so carefully cultivate is a biennial. They sow it in time for the autumnal rains to bring it up. Accordingly, about the 1st of November, if the fall has been seasonable, a beautiful green row of the *ant rice*, about 4 inches wide, is seen springing up on the pavement, in a circle of 14 to 15 feet in circumference. In the vicinity of this circular row of grass they do not permit a single spire of any other grass or weed to remain a day; leaving the Aristida untouched until it is ripe, which occurs in June of the next year, they gather the seeds and carry them into the granaries as before stated. There can be no doubt of the fact that this peculiar species of grass is intentionally planted, and, in farmer-like manner, carefully divested of all other grasses and weeds during the time of its growth, and that after it has matured and the grain stored away, they cut away the dry stubble and remove it from the pavement, leaving it unencumbered until the ensuing autumn, when the same species of grass, and in the same circle, appears again, receiving the same agricultural care as did the previous crop; and so on, year after year, as I know to be the case on farms where their habitations are, during the summer season, protected from the depredations of cattle. Outside of the fields they sow the grass seeds, but the cows crop it down two or three times, when, finding that there is no chance to carry on their agricultural pursuits, they cut it all away and re-establish the clean pavement. Our cattle did not often crop the ant rice until their

increased numbers have forced them to feed on all kinds of grass. That, however, has turned out favourably to the ant interest. For, while the prairies are being denuded of the stronger grasses, we have a delicate little biennial barley (Hordeum pusillum) that is filling all the naked places. It rises from 3 to 6 inches, producing fine grain for ant consumption. It matures about the last days of April, and from that time all the agricultural ants are seen packing it home daily through the summer. This species of ant subsists entirely on vegetable seeds. I have sometimes seen them drag a caterpillar or a crippled grasshopper into their hole, that had been thrown upon the pavement, but I have never observed them carrying any such things home that they had captured themselves. I do not think they eat much animal food.

I have often seen them have prisoners—always of their own species. I could not discover the nature of the offence that led to the arrestment; still I have no doubt as to the fact of its being so, and that the prisoner is very roughly forced along contrary to its inclination. There is never more than a single guard having charge of a prisoner, who by some means having obtained the advantage, and attacking from behind, had succeeded in seizing it with the mandibles over the smallest part of its back, and so long as it maintains this grip, it is out of the reach of harm from the prisoner.

In some cases the prisoner quietly submits, and folding up its legs, forces the captor to carry it along like a dead ant, as I thought it really was, until I caused its captor to drop it; when, to my surprise, it immediately sprang to its feet, and running wildly, succeeded in making its escape. It occurs more frequently, however, that the prisoner does not give up so tamely, but continues to make every effort to rid itself of its detainer. I have many times observed the prisoner manifesting all the indications of terror and great reluctance at being so unceremoniously dragged along. It will lay hold of and cling to everything that comes in reach, and by this means greatly retard the progress of its captor. When at last they arrive on the city pavement, half a dozen or more of the national guard, who are always on duty, rush upon the prisoner, aiding the seemingly fatigued captor, who still maintains its potent grip upon the now almost helpless prisoner, seize it by the arms, legs, everywhere, and in a very rough manner hurry it down into the entrance to the city, and out of the reach of further observation.

The agricultural ant is very tenacious of life. I dissevered the head of one at 4 p.m. on Sunday, and the head remained alive, retaining sufficient strength by pressing with its antennæ against the slip of glass upon which it lay, to move itself and change its position until 10 a.m. the next day.

It seems to be an established law amongst all species of ants, and particularly with the species in question, that when any disaster occurs to their city, the first thing to be done is to take care of the young, and, if possible, secure their safety; and so, when by any accident one of their cities gets torn up, it will be seen that they universally rush to the nursery apartment; and every one that can takes up an egg, the pupæ, the young in any stage of advancement, and will save its life, or lose its own. As far as I can understand and read their actions, every one understands its duty, and will do it or lose its life. I have observed the guards, when a sudden shower of rain would come up, run to the entrance of the city, and there meeting with another party coming up from below, would crowd themselves together in the hole in such manner as to form a complete obstruction to the ingress of the water, and there remain overwhelmed with the accumulating rain until it ceased. If the shower continues over fifteen minutes, they are found to be still closely wedged in the aperture, and all dead; and there they remain until the balance of the pavement guards, who during the shower had climbed some weed or blade of grass that grew near the border of the pavement, come down, and with some difficulty succeed in taking them out. They are immediately taken to some dry place on the pavement and exposed to the open air half an hour at least; after which, if they do not revive, they are taken off from the pavement, sometimes to the distance of sixty yards, and left on the ground without further care.

Long-continued rainy seasons, by deeply saturating the earth, will dissolve the cement of their cells, flood them, and drown the ants out entirely. I make allusion now only to the agricultural species of the genus. The first year after my arrival in Texas, I noticed that there were a great many uninhabited ant-hills, with pavements still smooth and nude of grass or weeds, indicating that they had been very recently occupied. The missing communities were all dead—extinct—had been destroyed by a series of rainy seasons. Then there were but few of these ant cities to be found that were occupied. But when the drought set in, the earth being no longer filled with water, they began to multiply very rapidly. City after city appeared as the dry weather continued, and now, 1863, at the close of a ten years' drought, they have spread so extensively, that their clean little paved cities are to be seen every fifty or sixty yards, especially along the roadsides, in the prairies, walks in yards and fields, barren rocky places, &c. In beds of heavy grass or weeds, or in deep shady woodlands, they very seldom locate a city. They prefer sunshine and a clear sky. This ant does not work in the heat of the day during hot weather, but makes up the lost time during the night. I have often found them busily engaged at 2 and even 3 o'clock a.m. Before

day, however, they call off the workers, and rest till about sunrise. In more favourable weather, when they can operate all day, they do not work late at night.

In regard to courage, there can be no mistake in stating that, when the interests of the nation are involved, this ant exhibits no signs of fear or dread of any consequences that may result to self while engaged in the discharge of its duties.

The police or national guards of a community which has been established three or four years number in the aggregate, of the parties on duty, from one to two hundred. These are seen all the time, in suitable weather, unceasingly promenading the environs of the city. If an observer takes his stand near the edge of the pavement, he will discover an instantaneous movement in the entire police corps, coming wavelike towards him. If the observer imprudently keeps his position, he will soon see numbers of them at his feet, and without the slightest degree of precaution, or the least hesitation, they climb up his boots, on his clothes, and as soon as they come to anything that they can bite or sting, whether it be boot, or cloth, or skin, they go right to work biting and stinging; and very often, if they get good hold on any soft texture, they will suffer themselves to be torn to pieces before they will relinquish it. If they succeed in getting to the bare skin, they inflict a painful wound, the irritation, swelling, and soreness of which will not subside in twenty-four hours.

If any worm or small bug shall attempt to travel across their pavement, it is immediately arrested, and soon covered with the fearless warriors, who in a short time deprive it of life. Woe unto any luckless wight of a tumble-bug who may attempt to roll his spherical treasure upon that sacred and forbidden pavement! As soon as the dark, execrable globe of unholy material is discovered by the police to be rolling on, and contaminating the interdicted grounds, they rush with one accord upon the vile intruder, and instantly seizing him by every leg and foot, despatch him in a short time. Sometimes the tumble-bug takes the alarm at the start, while only two or three of the ants have hold on it, expands its wings and flies off with them hanging to its legs. If it fails to make this early effort, it very soon falls a victim to the exasperated soldiery. The ball of filth is left on the pavement, sometimes in the very entrance to the city. In due time the workers take possession of it, cut it into fragments, and pack it off beyond the limits of the incorporated grounds.

I have not observed that anything preys to any considerable extent upon this species of ant. Chickens and mocking-birds will sometimes pick up a few of them, but not often. If anything else in Texas eats them, I have not noticed it. Neither have I observed their nests bored into or dug up in middle Texas.

The agricultural ant is of but little disadvantage to the farmer, however numerous, as it is never seen six inches from the ground, nor does it cut or trouble any growing vegetable outside of its pavement, except the seeds of the noxious weeds and grasses. Sometimes it is found stealing corn meal, broom-corn seeds, &c.; but it is only when it finds them on the ground that it steals even these.

Children occasionally get on their pavement, and are badly stung. A few of these pavement lessons, however, generally obviate that inconvenience. The pain of their poison is more lasting, will swell and feel harder, than that of the honey bee. If they insert their stings on the feet or ankles of the child, the irritation will ascend to the glands of the inguinal region, producing tumours of a character quite painful, often exciting considerable fever in the general system; the irritation will last a day or two, but I have seen no permanent injury arising from it.

During protracted spells of dry weather, they are frequently found in great numbers in our wells. They seem to have gone there in pursuit of water, and not being able to get back, to make the best of a bad condition. In this unforeseen dilemma, they will collect and cling together in masses as large as an ordinary teacup, in which condition they are frequently caught and drawn up in the bucket. When they are thus brought up, though they may have been in the water a day or more, they are all living, though half drowned and barely able to move. While in the well they are all afloat, and at least one-half the mass submerged. As it is known that this species of ant cannot survive fifteen minutes under water, how they manage when in a large half-sunken mass to survive a day, or even longer, is a question to which I may fail to give a satisfactory solution. I may, however, from experiments I have made with single individuals, in water, venture the assertion that there is no possible chance for the submerged portion of the globular mass, if it remains in the same condition in relation to the water, to survive even half an hour. Then we are forced to the supposition that by some means or other the ball must be caused to revolve as it floats. The globular mass must be kept rolling, and make a revolution every four minutes, or the submerged portion must die. To accomplish this somewhat astonishing life-preserving process, there is but one possible alternative. It can be effected only by a united and properly directed systematic motion of the disengaged limbs of the outer tier of ants, occupying the submerged half of the globular mass.

I saw to-day (June 15), in a clean-trodden path near my dwelling, quite a number of this species of ant engaged in deadly conflict. They were strewed along the path to the distance of 10 or 12 feet, fighting, most of them, in single combat. In some

few cases, I noticed there would be two to one engaged, in all of which cases the struggle was soon ended. Their mode of warfare is decapitation, and in all cases where there were two to one engaged, the work of cutting off the head was soon accomplished. There were already a number of heads and headless ants lying around, and there was a great number of single pairs of the insatiate warriors grappling each other by the throat on the battle-field, some of whom seemed to be already dead, still clinging together by their throats. Among the single pairs in the deadly strife there were no cases of decapitation. They mutually grapple each other by the throat, and there cling until death ends the conflict, but does not separate them. I do not think that in single combat they possess the power to dissever the head; but they can grip the neck so firmly as to stop circulation, and hold on until death ensues, without their unlocking the jaws even then.

The cause of this war was attributable to the settlement of a young queen in close proximity (not more than 20 feet) of a very populous community that had occupied that scope of territory for ten or twelve years. At first, and so long as they operated under concealment, the old community did not molest them; but when they threw off their mask, and commenced paving their city, the older occupants of that district of territory declared war against them and waged it to extermination. The war was declared by the old settlers, and the object was to drive out the new ones or exterminate them. But the warriors of this species of ant are not to be driven. Where they select a location for a home, nothing but annihilation can get them away. So, in the present case, the war continued two days and nights, and resulted in the total extermination of the intruding colony. From the vastly superior numbers of the older settlers, though many of them were slain during the war, they nevertheless succeeded in destroying the entire colony, without any apparent disturbance or unusual excitement about the great city. Their national works and governmental affairs went on in their ordinary course, while the work of death was being accomplished by their resolute bands of triumphant warriors.

They do not interrupt, in any way that I have discovered, the small black erratic ant, when it comes on their pavement. They even permit the erratic ants to erect cities on any portion of the incorporated limits, and do not molest them. It may be that the little fellows serve them some purpose. But when they build too many of their confederate cities on the pavement of the agricultural ant, it seems to be an inconvenience to them some way; but they do not go to war with them, nor attempt to rid themselves of the inconvenience by any forcible means. They, however, do get clear of them, and that by instituting a regular system of deceptive and vexatious obstructions. The deception is manifested in the fact that it appears to have suddenly become necessary to raise the mound two or three inches higher, and also to widen the base considerably. Forthwith are seen swarming out upon the pavement hosts of ants, who go rapidly to work, and bringing the little black balls which are thrown up by the earthworms in great quantities everywhere in the prairie soil, they heap them up, first at the base of the mound, widening till all the near erratic ant cities are covered up. At the same time, they raise the entire pavement an inch or so, and in prosecuting this part of the national work, deposit abundantly more balls upon and around the erratic ant cities than anywhere else. The little ants bore upwards through the hard sun-dried balls, which are constantly accumulating—getting worse every hour—until the obstruction has become so great that they can no longer keep their cities open; and finding that there is no remedy for the growing difficulty, they peaceably evacuate the premises. There is found on almost every pavement, at this season of the year, three or four small pyramidal mounds that have been constructed for the purpose of crowding out the little erratic ants.

The extensive, clean, smooth roads that are constructed by the agricultural ants are worthy of being noticed. At this season of the year their roads are plainest and in the best order, because it is harvest time, and their whole force is out collecting grain for winter supplies.

I am just this moment in from a survey of one of these roads, that I might be able to make an exact and correct statement of it. It is over 100 yards in length, goes through 20 yards of thick weeds, underruns heavy beds of crop grass 60 yards, and then through the weeds growing in the locks of a heavy rail fence 20 yards more; and throughout the whole extent it is very smooth and even, varying from a straight line enough, perhaps, to lose 10 or 12 yards of the distance in travelling to the outer terminus. It is from 2 to 2½ inches wide; in some places, on account of insurmountable obstructions, it separates into two or three trails of an inch in width, coming together again after passing the obstruction. This is the main trunk, and it does not branch until it crosses the before-named fence, beyond which is a heavy bed of grain bearing weeds and grass. Their prospecting corps travel far out, and when they discover rich districts of their proper food they report it, and a corps of foragers is immediately dispatched to collect and bring it in.

IN whatever light we consider the matter in whatever way we turn it over, the conclusion is forced upon us that useful knowledge becomes useful only when the mind knows how to use it aright.—*Quarterly Review, Oct.* 1867.

THE UNITY OF MANKIND.

I TAKE the liberty of offering a few concluding remarks upon this topic, not with a view of defending my own opinions or statements, but of endeavouring to serve the interests of truth in a question of such vast importance,—one of the greatest problems that can occupy the human mind; —and of placing before the readers of SCIENCE-GOSSIP the facts as they originally stood, as the gentleman who mooted the subject has altogether left the ground he first occupied.

In the May number of SCIENCE-GOSSIP, the writer in question, "F. A. A.," proposed to divide the races of man into three families, according to their colour—white, brown, and black, and then directly after into two—white and black, on the ground that brown is merely white in a state of transition; a division which, as "R. G." very justly remarks, has the merit of being simple if not satisfactory. Among the white he included the Mongols, who have thus become yellow without any valid reason; among the blacks he comprised the Hindoos, who are not black; and among the brown, the American aborigines, some of whom are as red as Armenian bole; the Gallas, some of whom are black and others fair; and the Indo-Chinese, comprehending at any rate some yellow tints. As all these are in a state of transition,* the process must be rather a slow one. When asked what he proposed to do with the millions of people who are neither white nor black, but, on the contrary, are red, green, chocolate, and other colours, he made no answer.

Having cut up mankind in this way, "F. A. A." proceeded to account for the different colour of the sections, and decided at once that it was owing to difference of climate. So far from being an almost inscrutable problem, it is a very simple affair indeed. Nature makes no mystery of her great chemical process. Any person who will look at the hands of a countryman or the face of an old Indian resident, can see how easily the white man turns brown. Any person who will read and believe Mr. Winwood Reade's assertion, that the Gamma tribes inhabiting the interior of the Gaboon country have turned black within the memory of man, can have as little trouble in understanding the second stage of the process. The objection made to this was, that such careful observers as Sir William Lawrence, Crawford, Knox, and others, who had devoted years of labour to the study of the subject, had arrived at the conclusion that there was not one jot of evidence to prove that white people transplanted to the tropics ever became black, and that the theory of the varieties of colour being due to heat was entirely unproved. Now, mark the reply. It is: 1. That Mr. Crawford admits that dark-skinned races do usually inhabit hot countries, a fact which had not been disputed, and which, if disputed, has no connection with the argument. 2. That "F. A. A." did "not believe that heat alone produces a dark skin; but that heat, an unhealthy climate, and prolonged isolation" (!) will "produce and perpetuate *the most marked and extraordinary peculiarities*." As "R. G." pointed out, such influences would produce, not blackness, but death, disease, and extermination,—different processes altogether. But, indeed, the whole sentence is so vague, that one can no more deal with it than fight with a shadow. "Extraordinary peculiarities" may mean anything, and therefore I leave "F. A. A." to settle the point with Mr. Crawford, whom he has attacked, and who is pretty well able to take care of himself. As to the quotation from Mr. Huxley, it appears to me so irrelevant, that I would rather not seek to influence the reader in the matter, so I refer him to the papers themselves.

"F. A. A." asserted that "we *know* from history, and the evidence of our senses," that "white nations *have become black!*" And in proof of this astounding statement, he cited the black Jews of Bombay, the Shegiar Arabs of Nubia, and the Hindoos. He was asked to give the names of some of the historians, as it was generally believed that history is silent on the subject of colour. "F. A. A." says that this is scarcely an ingenuous reply, because I must know that the colour of all the Shemitic races, as represented on the walls of the Nineveh palaces and Egyptian obelisks and temples, was a warm red-brown, and that I myself had quoted these very monuments as undeniable authorities concerning the colour of the Negro. If the reader will kindly turn to the passage in question, he will see that *I did nothing of the kind;* that I never mentioned the Assyrian paintings at all, and that I did not quote the Egyptian paintings as authorities in any way. Besides, I am not aware that all the Shemitic races are painted brown on any Egyptian obelisk, or that paintings constitute history.

"F. A. A." then put forward Mr. Winwood Reade's assertion that the distinctive blackness of the Negro is owing to disease,—a theory which he embraces with such ardour that he says he would go further, and "suggest that in the case of every black nation throughout the world *its* blackness is the result of disease," a statement I commend to the notice of those physiologists who would have us believe that the pigment in the skin of the Negro is a normal product; that he grows pale in sickness and starvation, and that he is blacker in proportion as he is healthier. To these objections "F. A. A." rejoins, not by proving that Mr. Reade is right, but by calling them a sneer and flippancy; forgetting that

* "It is very important to prove that brown nations are *merely white nations becoming black*, because, if we can do so, it will be a complete answer to the assertions of those individuals who dispute the unity of the white and black races!"—SCIENCE-GOSSIP, May 1, 1867.

calling names is usually looked upon as a sign of a weak case.

The next assertion was that "the more intense the colour, the more degraded the mind, the more stunted and distorted the body become." It is not very easy to make out here which are really the nominatives to the verb; but it was assumed that the three last were to be considered such. Now, the Negro may be considered as a specimen of advanced blackness. Yet, beyond all question, there have been negroes of high powers of mind and great attainments,—two totally different things, it must be remembered. Toussaint l'Ouverture, Freidig, Aldrich, Lislet, &c., were all men who had fought their way to distinction. Whole nations of paler-coloured people might be mentioned who have not produced a man of this stamp. The Negro, too, is undoubtedly powerful. Men like Lillywhite and Biasson, who could cope with the strongest English prize-fighters, would have made short work with the finest specimens of the very races who ought, on this theory, to surpass them. Lastly, unless we have been told a number of gross falsehoods, the Negro is often very long-lived. These arguments are not answered; a more convenient plan is adopted; they are called "a display of negrophilism." But if they were, this would not affect their validity. Three distinct results are said to accompany intensity of colour; it is shown that they do not, and this is negrophilism.

Lastly, "F. A. A." finds that I have made a great mistake about the Gipsies; and as this involves a most important point, I will endeavour to give as brief and clear an account of the matter as I possibly can. I laid it down as a principle, that as all these different races sprang from one common pair of parents, then, if climate were the cause of such diversity of colour, and operated so quickly as "F. A. A." proves it to do, we ought to find *all races who have lived long in the same climate of the same colour.* But there are instances enough to the contrary, and *several* of these were mentioned; *among others* the fact of the Gipsies, English and Welsh, living here from time immemorial without having become assimilated to each other.

I beg to call the reader's particular attention to the reply, as it is a fair specimen of the style of reasoning employed. "F. A. A." says Mr. Milton is particularly unfortunate in this venture, because it happens that the Gipsies did not enter England before the year 1427. However incredible it may seem, he offers no other ground for assuming that he has overthrown all the fatal objections to his theory; all the other facts stated are passed over. Now, though, for reasons stated in the "Stream of Life," I do not concur in the opinion of some writers as to the advent of the Gipsies; although the story of their having migrated into Europe in the days of Timour is several degrees more improbable than most of the incidents in Homer and Virgil, yet I will not avail myself of this plea; I will let it stand as an error, and go upon other ground. There is then, on "F. A. A.'s" *own showing*, still ample time for the assimilation to have taken place; and it has not taken place. Again, in this very paragraph, "F. A. A." was asked to account for the fact of two black races being found on the west coast of Africa, and immediately between them a moderately dark-yellow race. His reply is that the desert of Sahara was once the bed of an inland sea, which completely severed Africa from the rest of the old world (!), and that light-coloured races have got into Africa. But a glance at a good map will show that a sea, which was only the size of the desert of Sahara, could not have severed it from the rest of the old world, and we want to know *why there are light-coloured races between two black ones.*

"F. A A." frames a "*supposition*" that the red Foulahs have been "swallowed up in" the black Foulahs, and then says the supposition is "*collateral evidence.*" He finds, on his own showing, that the Negro ought to turn pale in America; and as this change does not ensue, he says it is because the Negro is the descendant of a race of criminals! and, according to the theory of natural selection, ought to be the most degraded of his type, which he is not. He was reminded that fair races, and even Albinoes, are found in very hot climates, while the Kamtschatkans and Aleutians have skins as swarthy, and hair as dark, as the natives of many low latitudes. He tells us that Sir John Richardson thought the *Esquimaux white*, and that we are "quite at liberty to attribute the dark colour of the Esquimaux to their southern origin." Of course we are; always supposing Sir John Richardson was wrong. Indeed, we are quite at liberty to say and do a great many things which still no person with a grain of common sense thinks of saying or doing, and therefore, with full liberty to do so, we don't attribute their dark colour to such a cause, when we know that the Scandinavians, who must on this theory have come from the south also, *are very much lighter in hue.* But supposing Sir John was right, then we cannot attribute their dark hue to a southern origin, for we cannot attribute what does not exist.

"F. A. A.," who has divided men into black and white, speaks of the *red* race, among whom he includes the Etruscans (!) Trojans (!) and Egyptians. Then he says that the Chinese came from Noah, and that he has not made up his mind as to whether the original race was white or *yellow*. He informs us that a great architectural work (possibly the Tower of Babel) was begun immediately after the Flood, and that the common origin of the New Zealanders and Hindoos is proved by their drinking in the same way. He says his theory is the only one which will account for the presence of brown adults among

black races—a privilege which might have been claimed with equal right by the old countryman who ascribed the rising of the Goodwin Sands to the building of Tenterden steeple. He tells us that some untenable views which he puts forward, prove the necessity for a theory which *insists* upon the acknowledgment of the Unity of Mankind, unconscious what a scathing censure he thus passes upon his own mode of reasoning; and winds up by congratulating himself upon having demolished "R. G." and Mr. Milton; forgetting that no one has constituted him judge in his own cause, and that he has laid his case before the readers of SCIENCE-GOSSIP, to whose fiat he must bow.

I decline to follow "F. A. A." in his attempts to connect his theory with revealed truth. I am quite of "R. G.'s" opinion, that such matters should not be imported into scientific discussions.

J. L. MILTON.

HOW TO PRESERVE SPIDERS.

A CORRESPONDENT in SCIENCE-GOSSIP, in the November number, signing himself "B. W. S.," asks the best way of preserving spiders, so as to retain their beautiful colours, and prevent their shrivelling up. As I was very successful in my attempts, perhaps the method I adopted more than forty years ago, while residing in the Isle of France, may help him.

Before answering his question, however, I may mention what I fancy is not generally known, or, if known, not attended to, that the colouring matter or pigment is placed between the outer or abdominal covering, and the pulpy contents within, upon a very delicate membrane, which adheres very loosely to both, but more firmly to the contents within; so that when the viscera or contents are rudely removed, and without much tearing, the whole mass will be found more or less coloured, while the outer skin will be left entirely transparent. If your correspondent is an anatomist, it will strike him, as it did myself, that the arrangement is very similar to what is observed in the coloured side of the choroid coat of the eye, when covered with its pigment. To preserve, therefore, the beauty of spiders, this must be untouched. In my first attempts, not being aware of this, I destroyed almost all of them, as here and there only spots of colour remained, the greater part being transparent. At length I succeeded most perfectly; and I have now in my possession some spiders put up so long ago as 1825 and 1827, as bright with their silvery bands, and others with their blue and red streaks, as the day when they were first preserved.

In the year 1825 or 1826, Admiral (then Captain) Duperré, in the French corvette *Coquille*, when on a voyage of discovery, put into the Mauritius, I made his acquaintance, and while examining my collection, the spiders at once attracted his attention, and he seemed so struck with the specimens I then had, that he requested permission to bring his naturalist to see them, and to give him some information as to the mode of preserving them. He also made me an offer of anything in exchange for the spiders from the numerous collection of objects of interest on board his frigate. I readily consented, and received from him shells (the study of which was then my hobby) such as I had not before possessed. Conceive my surprise and pleasure, when visiting the Museum in the Jardin des Plantes, in Paris, in the year 1851, upwards of a quarter of a century after, to find those I had given him in perfect preservation, maintaining all their colours in their original brightness, well distended, and in good shape, and labelled with my name. I mention this to show that the method I adopted is just as permanent as that for the preservation of any other similar object.

The plan is as follows: Make an incision along the ventral aspect of the abdomen nearly its whole length, or as long as will enable the pulpy contents to be easily removed; then pinch up the pulpy mass with a small forceps, carefully avoiding any dragging; then with a sharp-pointed scissors cut away the contents bit by bit until the whole is nearly removed, or until you can see the brilliant colour shining through what remains in the cavity —better leave a little too much than be too nice in clearing all away;—then with a blowpipe distend the empty abdomen: it will very soon become firm, and retain its original form; but until it is so the blowing must be frequently repeated. How long in our cold climate this may be required I can hardly say; but in the tropics, where the heat in the sun during the day is seldom under 120°, or even 140°, three or four times a day, for a couple of days, was quite sufficient to keep them permanently distended, as well as perfectly harden any of the contents which it was thought right to leave.

This was generally all that was required before placing them in their future abode; but sometimes I have coated the interior with a preservative which I have always employed for the bodies of beetles, moths, and even butterflies—for I empty; all and the result is, that all my cases of insects are as free from dust arising from the decay of animal matter as when originally put up. Sometimes in the larger-bodied Tarantulæ or moths I have stuffed them with cotton-wool wetted in the preservative; but generally this is not necessary. The frequent distention by blowing along with a heated atmosphere will be perfectly sufficient to prevent any future shrivelling.

I add the preservative, as it may be useful to others:—

Corrosive sublimate, ʒii.
Spirit of wine (a pound), ℥xvi.
Camphor ʒss. Mixed.

To be applied with a camel-hair brush.

No collector in a tropical climate need be informed of the destruction caused by the active little black ant, which infests every house, even when the object is placed on a table with its legs surrounded by water; for I have known these vermin, in the course of a night, make a bridge of their little bodies across a couple of inches of water, and make a clean sweep of the contents of the table; but with this preservative, in which my sheets of cork had been well saturated, and afterwards dried, I never knew ants approach any object when on the cork, *even* when lying on the ground.

Aberdeen. R. DYCE, M.D.

HOW BIRDS AND INSECTS FLY.

A COMMON quill pen affords as beautiful and complete an example of contrivance as can be found in the whole range of creation. The wing of which the quill pen once formed a portion was given to the bird for the purpose of flight; in other words, by raising and depressing the feathers composing the wing, the bird was to support itself in the air. But to a human workman an enormous difficulty would have occurred at the very outset of his undertaking. The feather, both for the sake of lightness, and to allow of the air passing through it unimpeded, must be made as it is; viz., of a central shaft with innumerable distinct laminæ projecting from it on each side. The problem to be solved was this, "How shall these laminæ be held together, so that they shall not be forced asunder by the action of the air during the downward stroke of the wing"? Now, see the beautiful piece of contrivance, the admirable example of design, to which I referred just now. If the reader has the good fortune to possess a microscope, or even a lens of a tolerably high power, he has only to cut or tear off a small piece of the feather—in fact, a few of the projecting laminæ—lay them on the stage plate, and gently force them asunder, and the mysterious secret will be revealed at once. He will see that one side of each laminæ is crowded with minute hooks: and a further study of the object will show him that these hooks are intended, and indeed do naturally fasten themselves on to the edge of the next-lying lamina. Thus the rows of laminæ on each side of the shaft are firmly bound together, the whole forming one continuous feather, an instrument of flight, which is unrivalled for lightness and pliancy, and at the same time, through the agency of these almost invisible hooklets, perfectly stiff and strong. I never had the patience to calculate their number, but the total amount in a single quill pen must be something astounding!

I need perhaps scarcely add, that no such contrivance is to be found in the wings of birds not destined for flight: they are wanting altogether in the apteryx, emeu, cassowary, ostrich, &c. Indeed, it is in a great measure the absence of these hooks which renders the feathers of the latter bird, and of the bird of paradise, so peculiarly lovely and so well fitted for purposes of ornamentation. In these, each lamina waves gracefully in the air, completely unconnected with its neighbour, and unrestrained by the iron grasp of the tiny instruments which so materially aid most of the feathered tribe in their flight.

To find any similar structure outside the ornithological world, we must make a long stride across the fishes and reptiles to the insects; past the beetles and moths (these, by the way, are sometimes allowed a single hook), and so on to the hymenoptera—the wasps, bees, and ants. In all these we once more come across this striking example of design in full perfection.

A careful examination of the organs of flight in a bee or wasp under the microscope discloses the fact, that the anterior margin of the lower wing on each side of the body is lined with a series of hard horny hooks, precisely the same in principle with those on the bird's feather, though very different in appearance. In point of fact, the insect's hooklet is much more perfect and, so to speak, better made than the bird's. Instead of being a mere strip from the membrane of the wing itself, it is composed of a distinct substance—chitine—the same substance which forms the stiff hard claws with which the feet of insects are terminated, and to which indeed these hooklets bear no little resemblance. The shape varies, too, much more than in birds. They are not all of the simplest form, like a fish-hook without its barb, but there is a regular gradation, from the stiff hooklet at the base of the wing, with its gracefully curved end, to the simple straight hair at the other end of the line.

Now, whence arises this extraordinary difference? Whence comes it, in fact, that the inferior animal (the insect) is gifted with a more perfect instrument than its more highly-organized relative, the bird? The answer is simple. Each individual hooklet in the bird's wing is comparatively weak, because, from their immense number, and from the peculiar organization of the wing itself, made up of innumerable lesser parts, the loss of a single hooklet is of very little consequence. A bird might lose a thousand of its hooklets, and doubtless often does, from the scattering shot of an awkward sportsman, and be none the worse for the accident; but the loss of half-a-dozen only would seriously impede the functions of an insect, and prevent it from holding its place in nature.

Consequently, each particular hooklet is made as perfect as possible. Looking at the matter from this point of view, we are reminded of an analogous instance in the case of "stings." The wasp has a single sting, as stiff and hard to break as a needle,

deeply embedded in the abdomen, and protected as much as possible from accident. The nettle, on the other hand, is furnished with innumerable stings; but they all lie on the surface of the leaf or stem, exposed to every passing danger, and each individually is weak and fragile. Here then we see the same difference as in the hooks of the bird and the insect. Deprive a wasp of its single sting, it becomes at once a defenceless animal, and must, in the great struggle for existence, inevitably "go under."

But a nettle may lose ten thousand of its weapons of defence, and yet still show a formidable front to the enemy. In a word, large numbers of comparatively weak individuals take the place of one or two stout guardians. For of course the hooklets on the insect's wing are intended to answer the same purpose as in the bird. To effect this, the posterior margin of the upper wing—in other words, the side facing the row of hooklets—is thickened, and folded back sufficiently to allow of the hooks having a firm hold when they catch in it. For this purpose no special organ is requisite. The hooks are so situated, that as the animal raises its wings in the effort to fly, they slide over the margin immediately above them without any special effort. And with what result? Precisely that which we know takes place in the case of the bird. While space is allowed for the air to pass between the wings during the time the latter are being raised, they are held together, and practically become one surface for pressing on the air during the downward stroke.

The hooklets, as may be supposed, vary greatly both in number and size. In the ants and "such small deer" they are few and weak. (The ant, be it remembered, wants them but once in its lifetime, and then only for a few hours.) In the huge strong flying hornet there are not less than a couple of dozen of the stoutest make.

The aphides being a four-winged family, are also furnished with this remarkable contrivance. Here again they are few and weak, for the aphis is not given to flying: he prefers an easy life on a rose-bush. Moreover, there is a singular variation from the "hooklet" law both of birds and hymenoptera. While in these they are arranged singly along the margin, in the aphides they are collected into a bunch, and appear to emerge as rays from one point.

Whether this tiny but powerful instrument exists in the other members of the homopterous family—the criads, aphrophoræ, &c.—I am not aware; but that it is in full force in birds and the insects I have mentioned, any experimentalist may ascertain for himself. The wings of a wasp which has died while these organs were firmly clasped together, forms a singularly pleasing object for the microscope, and one well worth mounting for permanent preservation.

W. W. SPICER.

QUEKETT ON HISTOLOGY.

UPON inquiry we have learnt that there are many students devoted to the microscope who have never heard that Quekett wrote and published a work entitled "Lectures on Histology." Some who know of its existence have but a crude notion of its contents or objects, and hence consider it of no interest to themselves. As this work is now to be obtained at half its reduced price, or one-fourth its published price, and as every microscopist should be acquainted with it, we hope to render service by explaining what it is, and wherein it concerns our readers.

"Histology is the science of the minute structure of the organs of animals and plants,"—so the work commences; and two volumes of 620 pages are devoted to the description of the microscopic structure of animal and vegetable tissues, illustrated by 423 woodcuts, many of which contain several figures. The first volume is devoted to elementary tissues, and treats of cells and their contents, as well as of vascular tissue and its modifications, fibrous tissues, cartilage, adipose tissue, and pigment. The second volume treats of the structure of the skeleton of plants and invertebrate animals, and includes such a wide range of subjects that it would be vain to attempt their enumeration. Sponges, Diatoms, Foraminifera, Zoophytes, and Molluscs, all receive attention; and if the book is only regarded as an illustrated catalogue of Histological objects, it commends itself. But it is more than this, and, despite its faults or failings—for books, like men, are all in this sense imperfect in a greater or less degree—it is a book which deserves to be better known than it is.

It would be absurd to write of novelties to be found in a book published thirteen or fourteen years ago; but it is not always the new which is the most true or the most beautiful. We confess to a liking for the woodcuts, for figures of microscopical objects published in microscopical books are not always either true or beautiful; but some of the figures in this work, although they have been freely copied, have not been surpassed. This is especially the case with hard tissues. It is worthy of note, also, that in the letterpress the author adheres closely to his subject, does not permit himself to be led away by hypothesis, does not pause to construct theories, does not diverge parenthetically for poetical illustrations, but holds the even tenor of his way, discoursing of what he has observed.

Now that three hundred students of "the world invisible," by means of the microscope, are united under the name of this author, it would be highly culpable in them not to become acquainted with this, not the least important of his works, especially when it can be accomplished at so small a cost.

THE USES OF VEGETABLE HAIRS.

AS the leaves and stems of many plants, as well as portions of their flowers, are covered with innumerable minute hairs of many various forms, it may be interesting to inquire what ends and uses these hairs serve in the general economy of plant-life; for that they have some general use seems clear from their frequent occurrence in many orders of plants. And as the hairs of animals have one general end—viz., warmth; but, coupled with this, have other minor uses, such as ornament, concealment, and even defence against their foes—so in the hairs which overspread the leaves and other portions of plants, there seems to be one great object for which they are designed; whilst other objects of inferior value, but still important, are readily observable, and indeed are sometimes more obvious than that which appears to be the general one. This end does not seem to be warmth, or protection from frost. For evergreens, which endure the frost, are precisely those plants which possess the fewest hairs; and these distributed on that part of the leaf which is least exposed to the severity of the weather. Their chief object appears to be rather to collect moisture from the air; their ends affording innumerable points on which the minute drops of dew may begin to distil. This is very apparent on a frosty morning, when the little crystals of frozen dew may be seen collected at the end of every hair of the leaves of such plants as the common buttercup, and others of the same kind.

And this seems to be borne out by the fact that most of the taller forest trees possess smoother leaves than the greater part of the little plants which cling to the surface of the earth, and are often covered plentifully with hairs. As the taller trees are, from the depth and abundance of their roots, less exposed to the consequences of a short drought than herbs, they do not need the same rapid power of condensing dew which the herbs possess: nor do they come so directly within its influences, which are always the greatest, the nearest to the ground. And evergreens, in which evaporation from the surface is necessarily slow, are still more independent of a moist atmosphere. Among these, ivy has a few scattered hairs, indeed, which may serve to draw some moisture, not only upon the roots which penetrate the earth, but upon those root-like processes by which it clings to trees and rocks and walls. So that this exception would help to prove the rule. And this seems to be true also with respect to ferns; for these possess but few hairs, yet certainly delight in moisture, and flourish best in damp and shady places. But still, except some kinds, which grow best in the spray of a waterfall, the moisture which seems most necessary for them is that which their roots obtain from the soil; and as they are adapted to grow under the shade of rocks and trees, there is not the same necessity for a quick distillation of moisture upon their surfaces.

As, then, the great majority of herbs do condense dew upon their surfaces, and this is found chiefly upon their hairs, it seems fair to conclude that one great end why vegetables are clothed with hairs is to bring about the deposit of dew most rapidly.

Besides this general use, there are others for which some kinds of hairs are certainly designed. Many terminate in glandular sacs containing some strong-scented fluid, as in lavender, primula sinensis, &c. These are frequently shorter than the ordinary hairs, which are often so disposed as to form a protection to them, and so, perhaps, prevent a too rapid dispersion of their scents.

The sting of the nettle shows another modification in the general structure of hairs. Here the gland containing the poison is situated at the base of the hair, which consists of one elongated cell open at the end. Through this aperture the poison escapes when the gland is gently pressed. In some plants the hairs are so modified as to serve for the purpose of climbing, as in the little hooks which fringe the leaves of the common goose-grass.

Again, the hairs which surround the throat of many flowers seem designed to protect the nectary from the intrusion of dust and other extraneous matter, and so to preserve the honey pure, and also, perhaps, by restraining evaporation, to keep it sufficiently fluid.

Other hairs, like the beautiful ones which clothe the leaves of *Deutzia scabra*, seem, together with their general office, to be designed for the ornamentation of the plant.

Perhaps these few remarks may seem to draw the attention of some of the readers of SCIENCE-GOSSIP to this subject, whose observations may confirm or modify the views which is here taken of the general uses of Vegetable Hairs.

J. S. TUTE.

SPIDER NESTS.

(*Theridion riparium.*)

NOW, pray, lady reader, turn not from the following hastily-arranged notes because they refer to a creature so generally despised by the "fair sex" as a spider. My object is to show you that in the economy of this humble little being there is much to interest the true lover of nature; furthermore, the subject of my gossip has nothing of a repulsive character about it, being a tiny thing but about the seventh of an inch long, and not at all ungraceful in appearance.

The cephalo-thorax (that portion of a spider to which the legs are attached, and on the fore part of which the eyes, mandibles, &c. are situated) is

reddish-brown and glossy; the eight slender legs are of a light yellow or yellowish-brown, marked in the neighbourhood of the joints with rings of reddish-brown; thus presenting somewhat the appearance of tortoiseshell. The abdomen is very convex above and very pointed at the spinners,—much resembling a boy's pegtop; it is thinly clothed with hairs, and is very glossy, the gloss being more perceptible when the spider is distended with food; the colour on the upper part is brown inclining to red, mottled with irregular spots of white and black, the white predominating, and forming an irregular line across the middle: in the centre of this is a blackish spot, and a little lower down a curved black line: the under part is nearly black, except in the neighbourhood of the spinners, where the colour becomes nearly red. The males are smaller than the females; the legs are, however, of the same length: these males are wonderfully active, incessantly on the move.

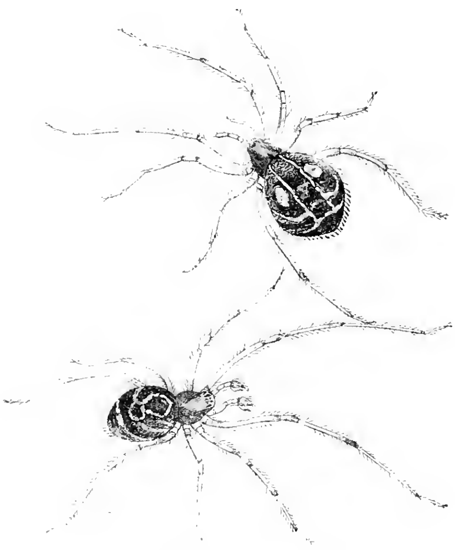


Fig. 1. *Theridion riparium*, male and female, enlarged.

My purpose not being to describe the anatomy of my tiny friend, but to speak of her habits and her curiously constructed domicile, I must refer those of my readers who desire to learn more of the structure of this and other spiders, to the previous pages of this journal, and to Blackwall's* excellent description of this spider. My specimens are not however, so distinctly marked as those figured in the work referred to.

The *Theridion riparium* is essentially a light-avoider; at all events, has a great antipathy to *strong* light, and usually constructs her singular nest under the shade of overhanging banks, seldom making her appearance during the day, but becoming active as darkness creeps on.

Desirous of observing more closely the habits of this little creature, I suspended five of the newly-built nests in the dead branches of a standard rose-bush, and placing this in a circular fern-case, covered the whole with a bell-glass. As soon as all was still, my *protégés* left their nests, and at once set to work to make them secure by attaching lines from them to surrounding objects. This operation was not accomplished without some difficulty, as, the space being limited, the spiders constantly crossed each others' lines, and for two days my little friends engaged in numberless conflicts; however, at the end

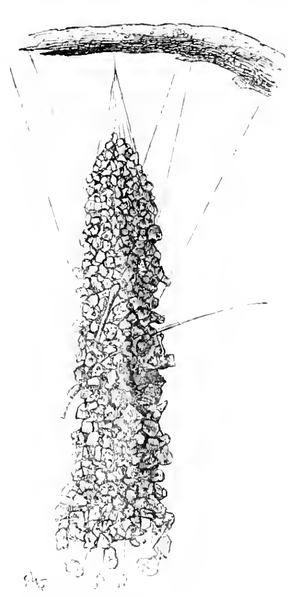


Fig. 2. Nest of pellets of earth, &c.

of this time they appeared to have made some friendly arrangement, as a collision seldom afterwards occurred, with one exception. In removing one of the nests, I had used it so roughly as to cause the lower part to collapse, and two of the spiders having attached their lines to it, had so securely closed the entrance as to prevent the egress of its occupant. Succeeding at last in making her way out, she was not successful in getting in again, so, boldly attacking a smaller spider with a more commodious domicile, endeavoured to take forcible possession. The rightful owner fought long and bravely in defence of her home and embryo family, until, dragged forth by the leg by sheer force, she became an outcast and a wanderer; and although many attempts were afterwards made to regain possession of the home she had been at so much pains to construct, they were all unavailing, and she shortly after died. In the course of a few days a brood of young spiders appeared in this nest, and lived amicably with their

* A History of the Spiders of Great Britain and Ireland, by John Blackwall. R. Hardwicke, 1861 and 1864.

foster-mother. In three of the four other nests broods soon followed; these remained with the mothers until the young had attained a considerable size,—a period of several weeks. The first, and probably the second moult, takes place within the nest; the third, after the young spider has commenced life on its own account.

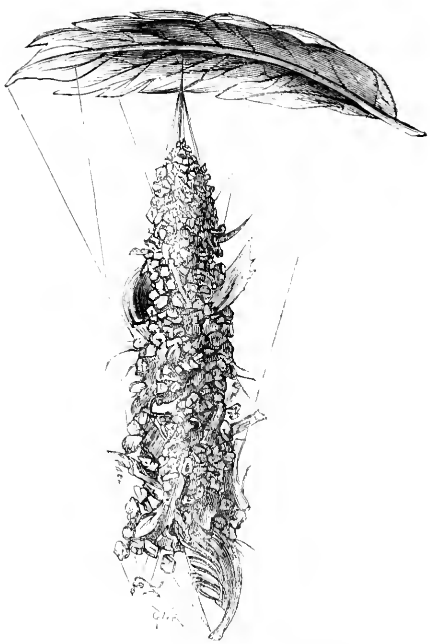


Fig. 3. Nest with dead leaves, twigs, &c.

The eggs were enclosed in nearly spherical cocoons of yellowish-white silk; the diameter of each cocoon being about one-eighth of an inch, and each contained about 30 eggs (arachnologists say that the cocoons of this species contain from 20 to 60); I had, therefore, about 120 young Theridions in my nursery: of these but four were males. Although so numerous, these juveniles appeared to be on very good terms, seldom engaging in any quarrels—not so frequently as the same number of boys in a school would have done.

When an insect is entrapped in the snare of the Theridion, she comes to the entrance of her nest to reconnoitre, and then, descending her cable, approaches the creature; if too large to carry off at once, she elevates her abdomen towards the unfortunate victim, and, by a curious movement of her two hindermost legs, draws from her spinners a thread with which she entangles its feet, and this without actually touching them. The line is so fine and the motion so rapid that it is difficult to ascertain the exact process; she, however, appears to give the thread as it issues from the spinners a curved motion; thus enabling her to entangle poor fly without risk of damage to her own person. Having accomplished this feat, Mrs. Theridion returns to the mouth of her nest, and patiently awaits the exhaustion of her prey, when another visit is made, and if necessary the operation repeated, when, weakened by its unavailing struggles, a line is attached to the captured fly, which is drawn up to the nest to have its juices extracted at leisure. The food of this spider is principally ants, and I have found many deserted nests literally full of the remains of these creatures. The spiders kept by me have all been fed with house-flies, and, notwithstanding the fineness of the threads of which the snares are composed, so tenacious are they, and so great the number and size of the viscid globules,

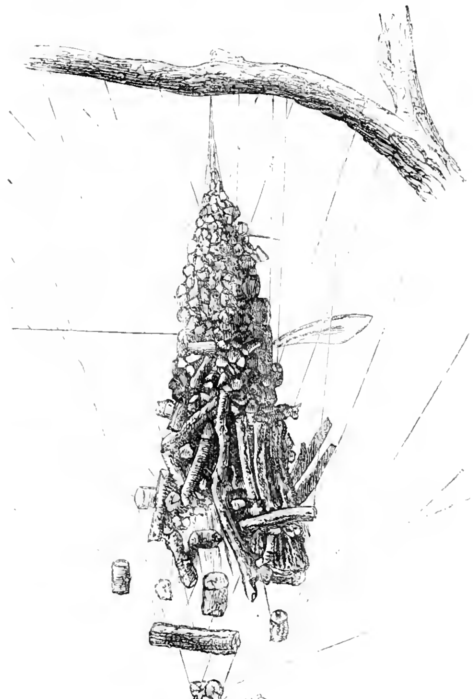


Fig. 4. Nest made of materials artificially supplied.

that I have seldom observed one escape after entanglement. It is most amusing to watch the proceedings of the juveniles when the mother is endeavouring to capture a fly. Hearing or seeing a disturbance, a young spider cautiously descends a line, followed at a distance by another and another; these, approaching the victim, are evidently as anxious to assist the mother as children are to use their little fingers when they see others busy; the fly struggles, and away scamper the young spiders as fast as tiny legs can carry them, repeating this process until they can with safety make a meal off poor fly. The Theridion exhibits the same wonderful affection for her eggs and young that is so marked a character in the history of other

spiders. When I have accidentally injured the nests and separated the eggs of several which I have removed to glass cases, the mothers have always carefully gathered the eggs together, and suspending them in the most sheltered spot, have collected such small particles of matter as could be used to form some protection from the light.

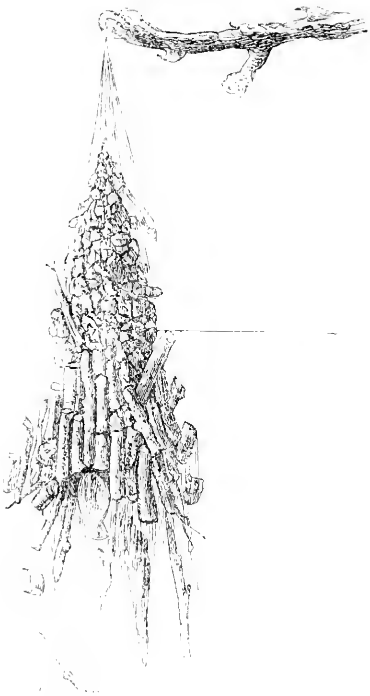
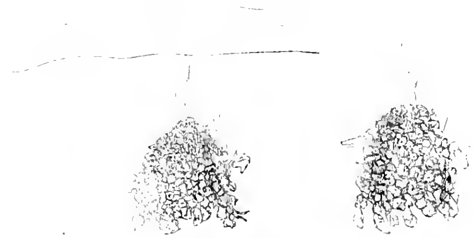


Fig. 5. Nest of twigs, &c., artificially supplied.

But it is time to speak of the singular structure which the creature fabricates. This is a tube of a conical form, varying in length from one to two and a half inches, closed above, but open at the lower end; the diameter at the mouth being about half an inch. The materials of which it is composed externally are small particles of hardened earth-pebbles, twigs, withered leaves, &c., rather slightly attached by threads: this tube is lined with silk, forming a comfortable home for Mrs. Theridion's large family. However irregular in appearance the nest may be externally, the interior is always beautifully smooth.

Although last year I found but one nest in my garden at Brixton, they have been numerous enough during the past summer and autumn. I have examined 60 or 70, and have kept some dozen of them under glass cases. Nearly the whole of these nests were suspended to the underside of the leaves of the raspberry, gooseberry, &c., at a distance of from two to four inches from the earth,—in a few instances suspended near the angles of an old wall. When constructed above the soil, earth and pebbles alone were the materials used; when built near the wall, small particles of mortar, &c. These are the most regular in form. When withered leaves were near, these and small twigs were freely used; nests formed of such materials being the least symmetrical. Figs. 2 and 3, sketched from specimens now before me, represent these two classes.

Wishing to test the building capabilities of these little architects, I have supplied those kept in confinement with small twigs cut into lengths of about one-eighth of an inch, mixing with them a number of larger pieces.



Figs. 6. and 7. Nests in course of construction.

Contrary to my expectation, the smallest pieces are not often selected, and frequently apparently most unsuitable pieces are chosen. Figs. 4 and 5 are examples of nests formed of these twigs. The upper parts (*a*) were built before I transferred them to cases; fig. 4 was constructed in the course of three weeks; fig. 5 was built by a wonderfully industrious mother of two large families: she is still in my possession, and has since made a neat little residence of particles of chalk, and is carefully guarding a cocoon of yellowish-white eggs. The mode of constructing these fragile dwellings is remarkable.

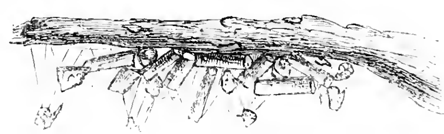


Fig. 8. Irregular structure.

Whilst the eggs remain unhatched, the nest seldom exceeds one inch in length; no sooner, however, does the careful mother find that she has to accommodate a large family, than a building impulse appears to seize her, and she may be observed on some occasion, perhaps after a long rest, to descend suddenly to the earth; she then takes a seemingly purposeless scamper over the materials beneath her nest, and passing many twigs, &c., apparently fit for her purpose, without any attempt to examine their weight or size, fixes upon a twig or other object which often appears disproportionate to her size and strength, and attaching a line to it, as quickly scrambles back again, dragging the twig after her.

This line she fastens to one of those which proceed from the mouth of her nest, which just serves to suspend the object. Returning, another thread is attached to it, and it is suspended midway between the earth and nest. A third trip serves to fix the substance at the mouth of her domicile, to be afterwards more neatly arranged. Several objects are thus frequently suspended, giving the nest at times a rather unfinished appearance, as represented in the foregoing figures.

Owing to the abundance of suitable materials to be obtained, those nests constructed in the open air are almost impervious to light, whilst those built by the spider when kept in confinement admit the light through the various interstices left by angular pieces of wood, &c. The little creature seems unable to remedy this, the objects being invariably attached by the inner surfaces only, and I have scarcely ever observed one of the busy little workwomen on the exterior of her house, excepting when forming a slight covering of silk on the upper part, which is sometimes done.

The snare consists of a few threads, apparently disposed without any order or arrangement: this, however, is not the case. From the mouth of the tube lines proceed to surrounding objects. The disposition of these threads is such that they enclose an inverted funnel-shaped space; the mouth of the nest representing the point of the funnel; thus affording the spider who takes her station at the entrance a convenient point for observation, &c. Several of the threads serve to steady the fragile dwelling; others, being thickly covered with the viscid globules, ensnare the unwary insect. Occasional deviations from this form may be observed, but as a rule, the outlines represent the figure described. Nests in course of construction are represented by figs. 6 and 7.

These are the forms commonly met with in newly-built nests; they however assume a more conical form as they are enlarged, owing, no doubt, to the increased weight of materials used and the slight way in which these materials are attached together.

From some unknown cause, the creatures kept by me have sometimes left their homes with their broods, and have built on the under side of a branch irregular structures: one is figured above (fig. 8).

The nests themselves form pretty objects, whilst the few hours spent in watching my tiny friends will afford the lover of nature much gratification; for, believe me, it is productive of much pleasure and instruction to study the habits of even a spider. In the economy of nature, spiders perform the same important office as regards insects that the carnivora do with respect to the herbivora—viz., prevent their too rapid multiplication; and although the foolish and ignorant may deem them cruel and ferocious, they but obey a law of their nature implanted by the All-wise Creator, whose beneficence is as manifest in the care with which He has provided for the humblest and most despised creatures, as in the abundant provision which He has made for beings more immediately useful to man.—*Edward H. Robertson, Brixton.*

LONDON COCKROACHES.

(*Ectobius germanica.*)

THE two species of Cockroaches commonly found in London houses are both importations from abroad. One, the *Blatta orientalis*, or ordinary "black-beetle," which swarms in every locality, comes from the East Indies; the other, a North American insect, the *Blatta americana*, is larger than the first, and of a light reddish brown colour. We read of this species that "it is met with occasionally in warehouses and outbuildings by the Thames, especially below London Bridge." Of late years, however, the *Blatta americana* has extended entirely across the metropolis, as it is found in Red Lion and Bloomsbury Squares, and in the Zoological Gardens, Regent's Park.

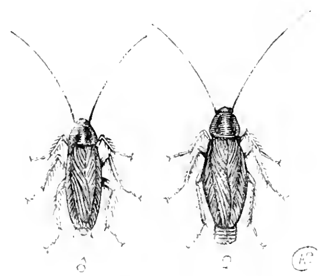


Fig. 9. *Ectobius Germanica.*

Two other species of Cockroaches are known in London—the *Blatta maderæ*, a native of Madeira and the adjoining islands, has been frequently taken in London; and the enormous *Blatta gigas*, from Western India, is common in our West India Docks. This objectionable insect is called the "Drummer"—the noise it makes keeping people awake all night.

These four species, all of them foreigners, belong to the genus *Blatta*; but the British species of Cockroach have been very properly separated from Blatta by Mr. Westwood, and formed into the genus *Ectobius*. About a dozen species are supposed to be indigenous to this country. They are smaller than the species of *Blatta*; and whereas in *Blatta* the first joint of the tarsus is longer than the others taken together, in *Ectobius* it is scarcely so long. In *Blatta*, also, the males possess two styles within the two jointed organs projecting from the abdomen; and the females are wingless; while in *Ectobius* these styles are wanting, and the wings are common to both sexes.

It has hitherto been stated that the two first-mentioned species, the *B. orientalis* and the *B. americana*, constituted the pest known as "black-beetles" in London; but that other species of Cockroaches are becoming nuisances, from their great numbers, was brought to my notice a short time since in the public room of an hotel near Covent Garden, where I observed and captured an example of the *Ectobius germanica*.

On making some inquiries, I found that it swarmed in thousands all over the place. How long this had been the case I could not learn; but I have evidence of its existence as far back as the year 1857.

The sketch of this species given above is of the natural size. The female has attached to her abdomen the egg-capsule or case, which is a most interesting object under a low power, and differs greatly from that produced by the common species.

A careful examination of a number of these egg-cases in various stages of growth will, I feel assured, convince the observer that what is said in the books about "the difficulty the female has in getting rid of this compound offspring" is an error;—that, in fact, the capsule is secreted, layer after layer, and when the last of these is completed, the whole is easily detached.

It is doubtful whether the *Ectobius germanica* is really a British species. It has been found in Portsmouth and Plymouth, and in merchant vessels. These localities would seem to indicate a foreign origin; and the specific name given to it has certainly a like signification.

It would be very interesting, but not very easy, to discover if any other species of these two genera are swarming in the lower strata of our overgrown city.

The difficulty of carrying out this inquiry is illustrated by the fact that the *Ectobius germanica* has existed in vast numbers, for at least ten years, close to Covent Garden Market, without attracting the notice of one person in any way acquainted with the subject.

The great majority of our respected but non-entomological fellow-citizens class everything in the shape of a Cockroach under the convenient name of "black-beetle," and they are, naturally, much more interested in the means of exterminating it than in making out the species to which it may belong.

Kensington. H. C. R.

AN EVIDENCE OF INSANITY.—"Things are not now quite so bad as they were when Lady Glanville's will was attempted to be set aside on the ground of lunacy, evinced by no other act than her fondness for collecting insects; and they had to appear at Exeter on the trial as a witness of her sanity!"—*Kirby and Spence's Entomology.*

ZOOLOGY.

A KESTREL'S DEFENCE.—A remarkable instance of fearlessness in a kestrel in defending its nest, came under my observation in the spring of 1864. A lad had climbed to the nest, in a tall fir-tree, and was about to grasp the eggs, when the bird, which he had disturbed from them, swooped at his hand, which he withdrawing suddenly, one of the eggs was broken to pieces by the talons of the bird.—*Harting's "Birds of Middlesex."*

LEFT BY THE TIDE.—On Sunday, Nov. 3, a young blue shark was found stranded in Chichester harbour. It measured between six and seven feet, and weighed upwards of sixty pounds.—*W. C.*

ANIMALS THAT NEVER DIE.—Will the reader be startled to hear that there are exceptions to the universal law of death—that there are animals, or at any rate portions of animals, which are practically immortal? Such, however, is really the case. I allude to species of the genera *Nais* and *Syllis*—marine worms of no special interest to the ordinary observer; but those who have watched their habits closely, tell us of a most extraordinary power of spontaneous division which they enjoy. Self-division, as a means of propagation, is common enough among the lower members of both the animal and vegetable kingdoms; but the particular kind to which I refer now is, I believe, peculiar to these singular worms. At certain periods, the posterior portion of the body begins to alter its shape materially; it swells and grows larger, and the transverse segments or divisions become more strongly marked. At last, just at the point where it joins the first half of the body, a true head is formed, furnished with antennæ, cirrhi, jaws, and whatever else goes to make a marine worm "perfect after its kind," and forthwith the whole drops off a complete animal, capable of maintaining a separate existence. Nor is this remarkable phenomenon confined to a single portion of any given body. Müller (Zool. Dan.), quoted in Cuvier's "Animal Kingdom," "describes one mother *Syllis prolifera*, in which three fœtuses of different ages appeared in one length. The mother had 30 segments, the young one nearest to it had 11, and the 2 hinder or older ones 17 segments each." After a time, the newly-formed animal becomes itself a mother; the same process of spontaneous division takes place; and so on for successive generations. Mr. Gosse, to whom we are indebted for so much accurate information regarding the life history of the lower marine animals, when speaking of this curious mode of continuing the species, adds:—"The facts have been denied; but we can give the testimony of personal observation to their truth, having witnessed the process." (Life, p. 141.) Whether the process

goes on for ever—that is to say, throughout all generations—of course no one can tell; but if it does—and there is no reason to suppose the contrary—then it is self-evident that the posterior portion of one of these worms is, as I observed before, practically never-dying. It is simply fitted every now and then with a new head! In fact, the tail of the first Syllis ever formed, provided it has had the good luck to escape external accidents, must still be in existence—a truly venerable animal, and without controversy "the oldest inhabitant" of the seas!—*W. W. Spicer, Clifton.*

COLIAS EDUSA IN IRELAND.—If "W. B." will refer to the *Entomologist's Monthly Magazine*, vol. iii. p. 4, he will learn that this insect is not uncommon in Ireland. Mr. Edwin Birchall mentions *Colias edusa* as "common in some seasons on the south and east coast; occurs more rarely north of Dublin; in profusion at Killarney in August, 1865." —*Edward S. Hames, Brettell-lane, Stourbridge.*

LATE SWALLOWS.—I saw at the railway station here, on Thursday last (November 28), a pair of swallows flying about quite actively, it being a sunshiny day with us. I fancy this is rather a late appearance of these birds. — *W. Hambrough, Worthing.*

LATE SWALLOW.—On the 30th November I saw a swallow flitting about Hackney Common.—*G. Bullard, South Hackney.*

BULIMUS GOODALLII, *Miller*.—This West-Indian species of shell appears to be gradually extending itself in the nursery grounds of this country. It has propagated for many years among greenhouse exotics at Bristol, but this morning a couple of living specimens were brought to me from the orchid-house of Mr. Day, of this place. His gardener says the animal is very destructive to the plants.— *C. Ashford, Grove House, Tottenham, 27th Nov.*

CONCHOLOGICAL NOTES.—I have lately taken one or two varieties of fresh-water shells which do not appear to be mentioned in any Conchological works; and as they are very distinct from the types of the species, I venture to report them in SCIENCE-GOSSIP. The first is a pure milk-white variety of *Planorbis nitidus*, of which about a dozen specimens, along with many of the typical colour, have been taken in a drain at this place. Another is a bandless variety of *Paludina listeri*, similar to the variety *unicolor* of *P. contecta*, mentioned by Mr. Jeffreys in his "British Conchology." The specimens were like the type, with the exception of being free from any trace of bands. The last is a variety of *Physa hypnorum*, which has the last whorl of the shell bluntly, but very distinctly keeled. The specimens were somewhat larger than the ordinary form of the shell. The two last-mentioned varieties, as well as the first, were taken near this place (Brigg, Lincolnshire).—*Thomas Ball.*

MARSH SNAIL (*Paludina listeri*).—The other day I noticed a habit of *Paludina listeri*, which to me was quite a new one. I was searching for the shell in a locality where it is usually very plentiful; but at first no specimens could be found, and it seemed as if it had disappeared for the winter; but at last I began to find shells here and there, partially buried in the mud, and further examination showed that in almost every case in which one could be seen, there was in reality a considerable number all huddled together and buried in one common hole; often as many as from twelve to twenty being thus congregated; reminding one of the winter conglomerations of *Helix aspersa.* Is *P. listeri* known to be social in its hybernating habits?—*Thomas Ball.*

COLORATION OF CHRYSALIDS.—I am very glad to see that one of the correspondents of SCIENCE-GOSSIP, in a recent number, has to a great exten confirmed my observations with regard to the coloration of chrysalids. I have not the smallest doubt of the fact that when exposed to view, as most of the butterfly chrysalids are, they are disguised in form, colour, and markings, also that the skin is sensitive to light and colour for a short time after the transformation, *i.e.* until it is dry. I would refer your correspondent, and all who may take an interest in the subject, to the *Zoologist* of December, which contains a paper read by me at a meeting of the Entomological Society. — *T. W. Wood, F.Z.S.*

BUGS.—A correspondent, writing about bed bugs, asserts that they will live half-an-hour or more when completely saturated with spirits of turpentine. I have put a single spot of turpentine on a bug many times—on a couple of scores at least—and invariably they straightened their legs, lifting their bodies as far from the ground as possible by that action, and never afterwards stirred. This morning I caught a fine bug, and having placed him on a slide underneath the microscope, applied turpentine. I had a powerful light shining through him, so as to render his internal arrangements visible, and at the end of *half a minute* there was no perceptible sign of life. My experience is that turpentine in any form is certain death to bugs. Salt and water does *not* act quickly or very efficaciously with the bugs I have had to deal with. The assertion that the odour is either delicate or agreeable needs no refutation. The writer must have peculiarities in his likings: most people find the smell strong enough, and certainly very disagreeable. I have read that spiders have an antipathy to bugs, and would eagerly devour them. I have tried this by enclosing various sorts of spiders—both garden and house—with bugs, and I never was able to get either to attack

the other, even when they had fasted for a week. I have therefore put this down as an unfounded statement. I do not think any evidence can be given that bugs eat each other.—*Edwin Holmes.*

BABY PRAWNS.—In *Once a Week* "J. K. Lord," in an article on "Prawning on the Sussex Coast," says—"The baby prawn, so it is said, is not much like its parents, and has to undergo several changes prior to its arriving at an adult form. * * * I am, however, disposed to think that the baby prawn, when it quits the egg, is the exact counterpart of its parent in everything except size." "J. K. L." may perhaps like to have this supposition verified as positive fact. The common prawn (*Palæmon serratus*) has often spawned in my tank, but I was never able to watch the final development, however, as the eggs always disappeared after a certain stage, being devoured as tit bits, I imagine, by other *crustacea* and fishes, until one day I found a vessel, in which a fine berried prawn had been living alone, swarming with hundreds of young prawns, say the eighth of an inch long, tiny, delicate, transparent little things, and apparently the *exact counterpart of their mother in everything except size.* So delicate and fragile were they, that my efforts to rear any were fruitless, though many were taken out and put into other vessels for safety.—*G. S.*

PHTHISIS AMONG SWALLOWS.—One day last August I chanced to walk along an embankment which divides the two reservoirs of the Wakefield Waterworks, a spot where swallows congregate in numbers. There was a large flight of them resting on the ledge, but as I advanced they took wing. On arriving at the spot where they had been most thickly seated, I found one poor little fellow who had just died, as he was still warm and flaccid. I put him in my pocket intending to distend his arterns with size injection, but on trying, next day, I failed from the coarseness of my nozzles; but that he might not be a useless find, I proceeded to dissect him. I found the pleural surface of the lungs to be studded with minute yellowish grey points which, when cut into and put under the microscope, presented all the characters of tubercle. At one point of the mesentery I found small indurated patches between the layers of the peritoneum which, I have no doubt, were lymphatic glands; their contents displayed something very like tubercular débris. I am not aware that consumption has before been noticed to occur in swallows, but the *à priori* reasons that it should do so are strong. Many tropical animal, as monkeys and parrots, suffer from tubercle when confined in this country, and I have seen the lungs of a goldfinch which had died of it, so that it is not unlikely that a few of the thousands of *hirundines* who are our summer visitors may fall victims to our dreaded malady. Recent experiments go to show clearly that phthisis is communicable to the lower animals by inoculation, and the Italian doctrine, that the disease is communicable from one individual to another by prolonged contact, as in the case of husband and wife, is under serious consideration.—*Lawson Tait, Wakefield.*

GEOLOGY.

SALT.—It is in the New Red Sandstone beds in England that enormous masses of salt are found, though the mineral is not confined to this formation in other countries. This important and abundant substance, so essential to life, is compounded of two things, either of which, if taken separately, would destroy life. In Cheshire there are beds of salt 120 feet thick; but Droitwich, in the middle of Worcestershire, yields the strongest and purest. In the time of the occupation of Britain by the Romans, salt-mines were worked at Droitwich, which still yield an inexhaustible supply, many thousand tons being annually obtained from them. A fountain of salt-water continually wells up; and from one spring alone a weekly produce of one thousand tons has been obtained.—*Jackson's "Cabinet of the Earth Unlocked."*

HUGH MILLER was a Scotchman, born at Cromarty, in 1802. His father followed the family calling of a sailor; and Hugh was still a child when his father was lost in a ship, of which he had risen to be the owner. At the Cromarty parish school, to which he was sent, little Hugh distinguished himself by his love of reading and his fondness for poetry; but he received his first taste for science from the instruction which an uncle gave him in natural history. Notwithstanding his literary and scientific aspirations, however, his circumstances obliged him to enter upon the humble occupation of a working mason; but it was in this employment that, while working blocks of stone in the quarry, he was also working out his future fame; and in these blocks he was unconsciously laying the foundation of his celebrity.—*Jackson's "Cabinet of the Earth Unlocked."*

ORBITOLINA GLOBULARIS is found in both the upper and lower cretaceous deposits of this neighbourhood, as well as in flint, but is more common in the Upper Chalk. In size it varies from that of a pea to a large nut, and is sometimes partially bored, and occasionally entirely perforated; and as it makes its way from the chalk-flints into the drift-gravel, it is thought, being occasionally perforated, to have been used by the early flint-working people of the Drift period to form necklaces; and hence it has been named the "fossil beard." In an article on the Foraminifera, in the *Annals of Natural History* for 1860, the following

occurs relative to the so-called "beads":—"In some of the figured specimens of *Orbitolina globularis* the not unusual hole in the base is indicated. Occasionally individuals are perforated by a more or less irregular tubular cavity. The roundness of the specimens, and their holes and tubular cavities, appear to have suggested to the old 'flint-folk' of the valley of the Somme that they might be used for beads; for such perforated *Orbitolinæ* are frequent in the gravels that yield the flint axes." I am not aware that there are any reasons for supposing that these little objects ever were adopted as ornaments by the ancient Celts, although, as in the case of other uncivilized races, they doubtless availed themselves of any pretty natural objects for that purpose which came in their way. The more likely suggestion as to the way the holes in the Orbitolinæ occurred is that they grew around the stem of some marine plant.—*Stevens's "Upper Test Valley."*

BOTANY.

Nasturtium siifolium, *Reich.*—This variety of *N. officinale* will be found to have a wide distribution; but, although growing near my house, I have completely overlooked it until the last summer. Your correspondent "B." is quite correct; the leaves are not like a *Sium*, but are similar in many respects to *Helosciadium nodiflorum*. An interesting query to solve is—Is it a true variety? Are there not many intermediate states to be found to connect it with the normal form of *N. officinale*? Is it ever found except in deep water or growing amongst rank herbage? I have only observed it growing in a ditch amongst the beautiful *Phragmites communis*. —*J. F. Robinson.*

Lemna gibba, *L.*—In the first number of the Science-Gossip for January, 1865, a short article was given on the British Duckweeds, which to me (and doubtless to many of your readers) was very interesting. I have ever since given its monthly issue a hearty welcome. However, after carefully looking over its pages, I have failed to see anything more about the Gibbous Duckweed. Doubts appear to be entertained in the above article as to its being distinct from *L. minor* (see page 7, vol. i.). I suppose no one must have made the experiment there recommended—namely, to "reduce it in pure water and force it to flower." It may not be known to all the readers of Science-Gossip that Mr. Wilson, author of the excellent *Bryologia Britannica*, many years ago, devoted much time and attention to the Duckweed in question, and gave the result of his observations in *Hooker's Botanical Miscellany*, vol. i., published in the year 1830. With this article there is an excellent tablet showing the seeds in germination. I would recommend any one wishing to know more of the structure, &c. of this minute plant, to procure the above volume. —*J. F. Robinson.*

Hastings Plants.—Your correspondent "J. C. M." has "a word for Hastings" with regard to the zoophytes there found. Permit me to add *mine* in behalf of its flora. Besides the rare plants mentioned in the local lists, whilst living there I discovered *Carduus Marianus* (milk thistle), *Tragopogon porrifolius* (purple goats' beard), *Mentha rotundifolius* (round-leaved mint), *Senecio erucæfolius* (slender rag-wort), and *Lotus corniculatus* var. *angustifolius*. I vainly searched for that extremely rare plant, *Lotus angustissimus*, which is said to grow on Castle Hill. I greatly fear it is now extinct in that locality.— *B. Daydon Jackson.*

The Calceolaria gracilis.—Having recently found a large quantity of this interesting little plant in an apparently wild state, a few notes on its locality may not be without interest. On going over a barley stubble on September 25th, I was surprised to find this plant occupying a space of about five acres in a fifty acre field, the soil is that of a light sand situate on the oolite sands of some of the geologists, the lias sands of others. It has a gentle slope towards the north, and when found several of the plants had been cut off with the scythe in cutting the barley, but had again shot, and were flowering abundantly. Since then much of the seed ripened, and some of it has already been scattered from the capsules. The crop previous to the barley was turnips, and some years since this part of the field was covered with wood. It is impossible to say how the plant originally came there, but it is quite clear that it has seeded on the soil, and come up in great quantities amid the barley, showing that this plant, though a native of Quito (South America), has grown sporadically in this country; and now, from its growth and extent, has every appearance of a wild native. It may be well to remark that it is accompanied by the *Spergula arvensis*, Corn Spurrey and *Scleranthus annuus*, Annual Knawel. The field in question is in a wild open part, half a mile from the village of Bradford Abbas.—*J. C. Hudson, Bradford Abbas, Sherborne.*

The Blue Pimpernel.—I have *twice* found this plant myself, once near York (in 1846), and again about six or seven years ago, on the Terraces, Wellington, New Zealand; there this lovely and rare English wild flower seemed doubly lovely, and I mentioned it with delight to some friends from the South, who told me that on the Canterbury Plains, the blue pimpernel was more commonly met with than the red variety. This I only mention on hearsay; but that I have found the blue pimpernel twice is an undoubted fact, and no true

lover of wild flowers will be surprised at my recollecting the circumstance even after the lapse of so many years.—*A. W., Waltham Holy Cross.*

EDIBLE FUNGI.—In the "Journal of Botany" for March, 1863, Mr. Cooke described a well, marked new species of *Pholiota* with decurrent gills, under the name of *Agarcius capistratus*, and of which he writes, "taste rather unpleasant;" and Mr. Berkeley, on referring to this species elsewhere, says it "does not appear to be esculent." The plant is probably rare, for it has not been observed in its old London haunts since 1863, and I never saw it till last week, when Mr. J. Aubrey Clark, of Street, Somerset, sent me three fine specimens out of a batch found at the foot of an elm. He did not know what the plant was, but wrote me concerning it:—"The smell is so mushroomy and wholesome, that I experimented on it to-day and found the flavour delicious." He wrote me the next day to say he had eaten largely of the species, and found it excellent. I also tried the three he sent me, and have no hesitation in saying they were truly delicious. Now, *Agaricus capistratus* is closely allied to another species much smaller and with adnate gills (*Agaricus pudicus*); it grows near elms and elders, and is generally acknowledged to be a good thing. Even Mr. Berkeley, who will not subscribe to the good qualities of *Agaricus rubescens*, writes of this plant "esculent!" *Agaricus pudicus* was extremely common this year about Tottenham and Walthamstow, where I gathered large quantities; but in every case the smell was so insufferably horrible as to preclude the very *idea* of tasting it. The above facts conclusively show that fungi are subject to some external agency which on certain occasions, and under certain conditions, entirely alters their nature.—*W. G. S.*

IVY AGAIN.—A similar instance to that recorded last month by Mr. Holland, exists at Tisbury. A friend of mine there, wishing to destroy an ivy plant which covered part of his house, caused the stem, three inches in diameter, to be sawn through. Although this was done more than three years ago, the plant, as yet, shows no sign of decay, being as green, and apparently as strong as ever.—*A. G. T.*

MICROSCOPY.

SNAILS' TONGUES.—Feeling especial interest in *Snails'* tongues, I cannot refrain from challenging your correspondent (A. M. Edwards) upon one part of his communication (1867, p. 277)—I mean the mounting of the tongues. As regards his method of preparation, it is one which I, and others here, have long practised with success, nor have I aught to say upon this part of the matter save that even with the most delicate species, *whilst fresh*, I have never found the boiling process injurious. When, however, Mr. Edwards recommends the soaking of these tongues in turpentine, and finally mounting them in balsam, I stand utterly aghast!—knowing by experience that such a course of treatment is quite useless for any purpose of scientific investigation, inasmuch as it involves two great evils—first, an utter distortion and flattening of teeth which lie in different planes; secondly, and yet more fatal, complete obliteration of all the most delicate features of an organism naturally very transparent. The only satisfactory way of proceeding is to mount in fluid, in a cell, with sufficient pressure to open out the ribbon, but not enough to reduce everything to a dead level. The fluid I find most advantageous is a weak form of Goadby's Solution; some advise salt and water, others glycerine; I object to the latter as giving too great transparency, and sometimes interfering with sharpness of definition. The use of polarized light is particularly valuable in an investigation of many of these tongues, and we on this side the Atlantic are at length beginning to learn that it is not necessary to sacrifice our specimens to Canada Balsam in order to enjoy its advantages. The one great cry of microscopists who use the Polariscope has always been "Give us light;" and indeed, with a Nicol prism below the object, and a Nicol prism above it, this demand is far from unreasonable; but let me say most emphatically, get your light by an alteration in the apparatus, not by a distortion of the object. Let the polarizing prism be fitted beneath an Achromatic Condenser, or, failing that luxury, have a simple convex lens of short focus fixed above it, and allow the arrangement to be fitted into a sliding jacket as you would fit a spot lens or a a parabola. Never again will you complain of want of light; *never again will you put a tongue into Canada Balsam.* And if accurate definition be wanted, or examination with high powers required, discard the abominable Nicol prism above the objective, and use in its stead a crystal of herapathite over the eyepiece. With such a polarizing apparatus as this, you may work as comfortably with a one-eighth objective as with a two-inch.—*W. R. May, Islington.*

HAIRS OF ANTHRENUS.—Since publishing figures of the hairs of Anthrenus in our last volume (p. 206), we have discovered a figure in Heeger's "Album microscopisch-photographischer darstellungen" (fig. 90) of the hairs of the larva of another species, *Anthrenus scrophulariæ*, which we have reproduced (fig. 10), as this species has also been found in Great Britain.

Fig. 10. Hair of Larva of Anthrenus Scrophulariæ.

NOTES AND QUERIES.

New Zealand Laurel.—Can you inform me the botanical name of a New Zealand laurel, the berries of which are said to contain peculiar properties? They are eaten by the natives after being soaked in water for forty-eight hours, and unless that precaution is taken, if eaten, they will cause a contraction of the muscles of the fingers, rendering them useless for a time. If you can also inform me whether any plants or berries are obtainable in this country, I shall feel much obliged.—*S. W. U., Norwich.*

For Cleaning Corals.—For this purpose a solution of chloride of lime was recommended to me some years since, and Mr. R. Holland will find that it will effect his object admirably. Exposure of the coral for a short time to the atmosphere after its bath will remove the disagreeable odour contracted from the solution.—*C. H.*

Noctiluca.—If "W. P.," when he can obtain Noctilucæ in abundance, would put a quantity of them into a basin of salt-water, let it stand for a quarter or half an hour, and then gently pour it off until about a quarter of a pint is left in the basin, he will generally find that this portion will contain large quantities of Diatomaceæ, and very frequently some very rare kinds. The portion poured off may be again treated in the same manner with success, only left to stand longer. The Noctilucæ generally abound at all seasons of the year when the weather has been calm for three days, and the wind in the south-west.—*P. R.*

Wasps.—In November Science-Gossip, p. 254, it is stated that the colour of the nests of wasps is one mark by which we may judge of the species. Last summer I was often in the bird-market at Leeds, and the bird-dealers showed me several "wasps' cakes" of different colours. One was "oak cake," that is, made of oak leaves; another, if I remember rightly, was "heather cake." They differed greatly in colour. The men said they could always distinguish one sort of cake from another by colour and tenacity. I fancy the colour of a nest will depend on the materials used in its fabrication. I did not see any outer shells of nests, only the internal parts with the grubs, which might have been the products of different species. The birdcatchers bring hampers of cakes with the larvæ to sell. They get them north and east of Leeds. I am situated three miles north of Wakefield, that is, in the neighbourhood where Mr. Smith found *Vespa arborea*. If either Mr. Smith or Mr. Ormerod will send me a description of *Vespaa rborea* and nest, I will do my best next season, if all be well, to procure them. I saw large quantities of grub-cakes in the market; some were fawn-colour, some bluish-grey.—*G. Roberts, Lofthouse, near Wakefield.*

Born and Died in a Box.—Sometime during the summer of 1866 a friend brought me a pill-box in which were three "antibilious" pills. One of the pills was only a shell; it had, like the mountain in the fable, been "in labour," and brought forth, not a mouse, but a maggot, the larva form of some of our moths. After showing the phenomenon to several parties, as a certain proof that such pills, if not beneficial, were at any rate not poisonous, I laid the box with its contents aside, and thought no more of it. A few weeks ago the same box came in my way again, and looking in, behold another act of the drama of life had been performed; the imprisoned larva had been transformed into the image, and had fretted away its short existence within the narrow and fragile walls of a pill-box. I am not an entomologist, and can't pronounce as to the species; but it is one of the ordinary moths that frequent drawers and such-like places, and which good housewives indignantly charge with perforating the wearables under their care.—*S. A. S., Belfast.*

Centenarianism.—The *Warrington Advertiser* of November 30 records the decease of no less than three persons who have passed their hundredth year; one by twelve days, one by two years, and a third by twelve years, which last, a lady, died from injuries received in falling down stairs.—*A. G. T.*

Garden Vermin.—Can any of your correspondents inform me how the abundance of snails, slugs, &c., is to be accounted for? I do not know whether all parts of England have similarly been infested with them. In my own garden (a small one) I destroyed nearly a thousand in a very short time during last summer. Surely such a sharp winter ought to have killed them.—*S. E. E., St. Leonards-on-Sea.*

Hornet's Nest.—In a woodshed attached to a house that is occupied by a man named Hook, at Fair-oak, near Petersfield, may be seen a huge hornet's nest, the circumference of which is 39 inches. It is most curiously worked in the apex of the roof and formed in a perfect globular manner. Like all other nests of the Vespidæ or Wasp family, it is constructed with the mouth of its cells downwards, and the outside appears to be composed of films much resembling those of birch-bark. When this place was first chosen by these unwelcome intruders, they commenced working with wonderful assiduity in the forming of their nest, and with this industrious movement, their task was completed with seeming magical power. This part of Sussex appears to be a favourite district for hornets, which I cannot account for; unless they have, like the beetles, a peculiar fondness for sandy localities. Several other nests have been discovered in the neighbourhood during the past season, but the one mentioned above is affirmed by all who have seen it to be the largest and the most beautiful formed one they ever witnessed. Fortunately, the family (proper) has received but little or no annoyance from these pugnacious and often malignant creatures—no one has suffered by their formidable sting, which to me is singularly mysterious. The secret, however, would be easily explained, if we could be persuaded to believe the fanciful notion asserted by some, that they are under the dominion of the Dog-star. It is a wise plan to avoid them as much as possible, for I am convinced that they grow more angry and fierce when disturbed or pursued.—*George Newlyn.*

Preserving Spiders.—After many trials, I found the best way to preserve spiders was to suspend them, by a loop round their waist, in a solution of glycerine $\frac{2}{3}$, water $\frac{1}{3}$. The solution may want changing once or twice at first; after that, it will keep unchanged for years. I have some spiders which have been preserved thus for more than ten years. The little bottles in which chemists put pills, make excellent preparation jars for this purpose. Oil, perhaps, might answer equally well. I never tried any but house-spiders.—*O.*

CRICKETS.—In reply to "Geo. B.," respecting crickets, mix one table-spoonful of wheat-flour, and one tea-spoonful of red lead, and a very small quantity of arsenic. Spread it thinly on clean white paper, and place it near to where the crickets appear. It is equally efficacious in the case of beetles, &c. Care must be taken with it, for it is a *poison*. Hoping your correspondent may get rid of his pests as soon as we did.—*H. G. Brierley.*

PRESERVING SPIDERS.—"B. W. S." will find the plan used by the Rev. L. Guilding for preserving spiders in Loudon's *Magazine of Natural History*, vol. vii., page 572. In case he has not the book, I send an extract which, perhaps, will be sufficient. Puncture the abdomen rather laterally beneath; gently press out the contents, and with the forceps remove the viscera. With a pointed pipette distend the abdomen with air, and with a syringe inject any size preparation till every part is plump and well extended. Clean and extend the legs like insects'. It preserves the colours and markings of the most delicate.—*E. T. Scott.*

FALL OF THERMOMETER.—Between yesterday morning (Dec. 1st), 10 a.m., and this morning, the same hour, my thermometer indicated a fall of 25°, marking respectively 51° and 26°; north aspect, protected from wind, six feet from the ground; an unusual fall in temperature within twenty-four hours.—*Charles Frederick White.*

IMPROVED THERMOMETER.—Mr. W. Moginie has designed an ingenious improvement in thermometers for suspension outside a window. By the arrangement of the mounting, the tube is turned towards the window sufficiently for its indications to be read off distinctly from the inside. This improved form is sold by Baker of High Holborn at a very moderate price.

SNAILS.—When night is coming on, and the slugs and snails are all about and busily at work, arm yourself with a bucket of lime and a trowel, and take a *little* lime on the point of the trowel and dust it along the flower-bed, hedge, or other place where the snails congregate. The lime should be thrown about eighteen inches from the ground on a flower-bed, or if the weather is damp, a little higher, and it will float along in the air, from ten to twenty feet, settling on everything in its way as it goes. Although it may not be seen, its effects may be traced, if there are many snails about. If there is a slight wind moving, it will be most useful, as the operator can use a larger quantity of lime, and it will be carried farther than if it was quite calm. It must be thrown in the direction that the wind is blowing in, or it will not go so far. A very small quantity of lime, when it drops on a snail, may not kill him at once, but it will settle him sooner or later, as he cannot move anywhere without encountering lime on all sides if it is well applied. One great advantage to this mode of liming is that plants with handsome foliage, &c., are not disfigured by great lumps of lime on them. A clever workman will cover a bed ten feet by ten with considerably less than a pint measure full of lime.—*T. J. S., Ludlow.*

SNAILS.—Mr. George Newlyn sends us the following from the "Cottage Gardener's Dictionary:" "They are effectually destroyed by either salt or lime; and to secure the contact of these with their bodies, it is best first to water the soil where they harbour with lime-water, in the evening, when they are coming out to feed; sprinkling the surface at the same time with dry lime, and at the end of a week applying a surface-dressing of salt at the rate of five bushels to the acre. If cabbage-leaves are spread upon the surface of land infested by slugs, they will resort to their under sides, and thus they may be trapped; but lime and salt are most efficacious. Lime-water may be poured over wall-trees infested with them, and they may be syringed with it as well, with water in which gas-liquor has been mixed, about half-a-pint to a gallon. If lime be sprinkled along the top, and at the base of the wall, renewing it weekly, the slugs cannot get at the trees. 'Fresh brewer grains placed in small heaps, are good traps for them; and frequent earth stirring helps to banish them.'"

CRICKETS, TO KILL.—A paste made as follows and placed in the haunt of crickets will destroy them. Confection of dog rose, 1 ounce; tincture of opium, 1½ drachms.—*F. R. Morris.*—The following are also sent by a correspondent, as derived from the *Daily Post.* You may drive away the crickets by burning the potato parings behind the fire of the infested room daily. This remedy has been tried by the writer, and found effectual.—Arsenic mixed with oatmeal, and placed in their haunts, will destroy crickets. Perhaps it will not be out of place to say that great care must be exercised in the use of this receipe: the mixture must by no means be placed within the reach of children. It can be placed safely overnight in that great cricket producer—the ash pit. Even if the house be swarming with crickets, two or three doses will be quite enough for them.—*S. R.*

WORMS.—Sulphate of copper dissolved in water, in the proportion of 2 ounces to a gallon, and used with a watering pot, causes the worms to turn out, so that they may be picked up. Corrosive sublimate has the same effect, but is more expensive. —*Alice M. Morris.* J. D. Hardy recommends the same means, adding that it is better to use it after rain.

The gardener being in the habit of saturating flower-pots with lime-water, before placing them in the greenhouse for the winter, in order to destroy worms and slugs, tried the same plan with a portion of the lawn with perfect success, quantities of dead worm, being found on the grass on the following morning.—*L. M. P.*

BLACK BEETLES.—Flour, red-lead, and sugar, equal parts, well mixed, and laid about the places where they resort. The insects will readily eat it and die; the living will eat the dead, and so one kills the other.—*Charles Head.*

HACKNEY MICROSCOPICAL SOCIETY.—A microscopical section has been formed in connection with the Cambridge Heath Mutual Improvement Society, and meets in the lecture-room of the Cambridge Heath Congregational Church. The secretary is Mr. W. Holman, of 2, Victoria Park-road.

WASP NEST.—Having seen your notice of the nest of *Vespa holsatica*, I write to inform you that I found one of the same description as your correspondent has given from Latreille. It was suspended to the roof of a shed. The envelope consisted of three coverings, the nest was an inch in diameter, and there were only two tiers of cells.—*Arthur H. Todd.*

HEDGEHOGS.—I must confess myself sceptical as to the hedgehog purposely rolling itself upon fallen apples and pears, in order to transfix them with its spines, so that it might carry them away to its retreat for food. In the first place, I very much question whether the hedgehog would eat food of this kind; for though Gilbert White says it will grub for and eat the roots of plantain, yet its appetite is a very carnivorous one, and its general food consists of insects, worms, slugs, eggs, &c. In the second place, I cannot but think the alleged operation most difficult of performance. With a soft fruit, like the arbutus, the feat *might* be more easy of accomplishment; but having got the fruit thus skewered on its back, how is the animal to get it off again? It cannot reach its back with either feet or mouth, and additional rolling, instead of detaching the fruit, would but drive them further on the spines.—*W. J. Sterland.*

CHEAP BREEDING CAGE.—The following is a cheap and efficient breeding cage for the larvæ of Lepidoptera:—Take an ordinary flower-pot, put some drainage at the bottom, and then fill it one-third full of light earth. Procure a piece of thick galvanized iron wire, and bend into a ring slightly larger than the rim of the flower-pot, sew a piece of leno to this ring, so as to form a shallow bag about two or three inches deep. This cover when dropped over the rim of the pot forms a close and neat lid. The stems of the food plants may be inserted into the earth, which may be damped when necessary without fear of mildew, if the pot has been properly drained. I have used pots with a pane of glass by way of a lid, but the glass is liable to be shifted or broken, and, as far as my experience extends, many larvæ do not feed kindly under g ass—they ramble about and spend a large part of their time in fruitless endeavours to make their escape through the glass, evidently not being able to comprehend its nature.—*T. H. W., Ludlow.*

VIPER'S LAIR.—I am not much of a naturalist: I am not quite sure that I know a viper from a snake when I see one: but I do know Poundbury, and was rather surprised to find that your correspondent, C. H. Bingham, does not consider it a likely place for this reptile to have been found on. It certainly is open and wild enough for any viper to bask in the sun on. I have just read a very good account of the viper, in an admirable little book called "British Reptiles," and I do not find anything mentioned there calculated to make me doubt a viper or vipers selecting Poundbury for their habitation; but Poundbury was certainly not the scene of the death alluded to by your correspondent Mrs. Watney. I do not think it at all probable that two places in the immediate vicinity of Dorchester witnessed so sad an accident; and I perfectly remember hearing, when staying at Dorchester three summers ago, of a woman having been bitten by a viper on Maiden-Castle, and of its having caused her death. Mrs. Watney probably alludes to this circumstance.—*A. C. J.*

SPIDERS AND ANTS.—In a recent communication from India, it is said the spider attacks the white ant. It reminds me that I was watching a desperate fight between two ants on my garden-wall last summer, when one of the ants happening to touch the thread of a spider's web, the spider popped out like lightning, and took them both in-doors, where I presume he soon settled their little difference.—*W. G. S.*

YELLOW VIOLETS grow in the greatest profusion on the mountain on which is situated Fort Mirabouc, between Bobbio and the Bergerie de Pré, also in the Forest of St. Nicolas near Courmayeur, and sparingly on the Petit St. Bernard. Some roots brought home from the forest above named weathered the cold of last winter and are now as strong plants as any other in the garden. I should be glad to know if others had made the same observation. My brother-in-law in Thebes saw the seed-vessels forming and *ripening* without any apparent blossom. It would have been impossible to have watched plants more narrowly than I did mine during the few months I was travelling about with them, yet I frequently saw a seed-vessel succeed a very small bud. None of these violets had any scent.—*E. Jeffreys Law, Bath.*

DEATH'S HEAD PUPÆ.—As to the power of producing sound possessed by pupæ of *Acherontia atropos*, I bred three specimens last December, by forcing them near my sitting-room fire. I observed that for about twenty-four hours before they emerged, they continued to squeak at intervals. This noise they increased when handled. The noise became so loud one day, when I had placed the box in a closet in our kitchen, that the cook came to tell me that a mouse had got in beside "them nasty black things." I have heard the pupa squeak at other times, but not near so loud or frequent as for a day before emergence.—*J. M. Hick.*

LIZARDS' TAILS.—I have frequently seen the small brown Lizard of the Riviera drop its tail when escaping from my boys at Mentone a few winters ago. I have in my possession, in spirits, a lizard with *two* tails which were both adhering to the body when caught, but one of them dropped off afterwards. The animal had evidently failed in entirely getting rid of its old tail, and the other had grown out of the part of the body from which the old one had been separated: both tails are about the same size.—*H. W.*

SPIDER DOINGS.—Father Babaz, who has spent some fifteen years in observing the doings of spiders, has just communicated to the French Academy of Sciences some new and remarkable facts connected with those interesting insects. He has discovered, for instance, that spiders have the power not only of *spinning* a web, but of *projecting* one to any given point, as far off as six or seven yards. That is to say, a spider, lying upon a table, can shoot a film up to the ceiling and escape by it. He has also discovered that some kinds of spiders can swim in the air without any web at all. To perform this feat they turn their back to the ground, and keep their legs closely folded up on their body, and in this posture sail about with perfect ease.—*Birmingham Daily Post.*

GRATIS!—It is the voice of nature, speaking from the fulness of her large heart. The word is written all over the blue heaven. The health-giving air whispers it about us. It rides the sunbeam (save when the statesman puts a window-pane 'twixt us and it). The lark trills it high up in the skyey dome; the little wayside flower breathes gratis from its pinky mouth; the bright brook murmurs it; it is written in the harvest moon. Look and move where we will, delights—all "gratis," all breathing and beaming beauty—are about us; and yet how rarely do we seize the happiness—because, forsooth, it *is* a joy gratis!—*Jerrold's "Chronicles of Clovernook."*

NOTICES TO CORRESPONDENTS.

ALL communications relative to advertisements, post-office orders, and orders for the supply of this Journal should be addressed to the PUBLISHER. All contributions, books, and pamphlets for the EDITOR should be sent to 192, Piccadilly, London, W. To avoid disappointment, contributions should not be received later than the 15th of each month. *No notice whatever can be taken of communications which do not contain the name and address of the writer*, not necessarily for publication, if desired to be withheld. We do not undertake to answer any queries not specially connected with Natural History, in accordance with our acceptance of that term; nor can we answer queries which might be solved by the correspondent by an appeal to any elementary book on the subject. We are always prepared to accept queries of a critical nature, and to publish the replies, provided *some* of our readers, besides the querist, are likely to be interested in them. We cannot undertake to return rejected manuscripts unless sufficient stamps are enclosed to cover the return postage. Neither can we promise to refer to or return any manuscript after one month from the date of its receipt. All microscopical drawings intended for publication should have annexed thereto the powers employed, or the extent of enlargement, indicated in diameters (thus: × 320 diameters). Communications intended for publication should be written on one side of the paper only, and all scientific names, and names of places and individuals should be as legible as possible. Wherever scientific names or technicalities are employed, it is hoped that the common names will accompany them. Lists or tables are inadmissible under any circumstances. Those of the popular names of British plants and animals are retained and registered for publication when sufficiently complete for that purpose, in whatever form may then be decided upon. ADDRESS No. 192, PICCADILLY, LONDON, W.

P. W.—As far as we can, we endeavour to persuade our contributors to give the popular as well as the scientific names of the subjects of their communications.

F. B.—No. 2, *Hypnum cupressiforme*, var. ε *filiforme*. No. 5, var. δ *elatum*. No. 6, var. η *ericetorum*.—*R. B.*

J. P. R.—No address enclosed, therefore we could not reply. The answer would occupy too much space. See SCIENCE-GOSSIP for 1865, p. 134.

MOSSES (F. B.)—1. *Hypnum Sendtneri*. 3, *H. Swartzii*. 4, *H. riparium*.—*R. B.*

BONSALL.—*Meridion circulare*.

J. D. R.—Cannot tell; probably the larva of the meal moth.

STORM GLASS.—Is a secret.

W. L. H.—Lichens are easily detached from trees by removing a portion of the bark with them. Stones must be chipped off with the lichen adhering. We know of no other than what is known as Klotsch's method for preserving the larger fungi.

A. S.—We can only name "Berkeley's British Mosses," (published by Reeve & Co.); cheaper than "Wilson's Bryologia."

H. G.—It is too late now to trace the address.

E. S. H.—The new volume commences with the new year.

J. B. B.—The fly sent in October is *Asilus crabroniformis*.

G. B. C. (Ringwood) may apply to S. C. Sayer, Swinton, Manchester, and learn of the disease and cure of his bird.

E. T. S.—We really cannot admit any further controversy on such a palpable subject as the orifice in the fangs of spiders, but would commend our correspondent either to a better instrument, or a better method of using it.

W. B. can obtain "Quekett's Histology" from Wheldon, Great Queen-street, for 7s. 6d.

G. M. W. V.—The Zoophyte is *Sertularia operculata*.—*E. C.*

W. J. S.—We must be permitted to judge for ourselves what we shall insert. Paragraphs exhibiting a puffing tendency we object to, and believe it a valid reason for declining any communication.

F. S.—Landsborough's "Popular History of Zoophytes." Routledge. Price 7s. 6d.

T. H. W.—Cooke (Naturalist, Oxford Street, generally has pupæ of Papilio Machaon on sale.

J. B. L.—No. 1, *Trichostomum flexicaule*. 2, *Dicranella heteromalla*.—*R. B.*

NO NAME.—We are again compelled to remind correspondents that letters sent without name and address will not be inserted, or their queries answered.

J. J. W. K.—It is *Tropicoris rufipes*, belonging to Hemiptera Heteroptera.

A. T.—Decaying organic matter, but no seeds.

R. J.—That which is called the Fur Seal is *Phoca Falklandica*.

EXCHANGES.

DIATOMACEOUS EARTH from Duck Pond, Waterford, Maine, U.S., for good mounted objects.—E. C. B., care of Editor of SCIENCE-GOSSIP.

COMPOUND SPIRAL FIBRE of *Nymphæa edulis* from India (mounted) for good mounted objects.—C. C., SCIENCE-GOSSIP, 192, Piccadilly.

PITCHER of American Pitcher plant (*Sarracenia purpurea*) in exchange for three good mounted objects.—B., SCIENCE-GOSSIP, 192, Piccadilly.

CLOUDED YELLOW AND ORANGE TIP in exchange for Bee Hawks or Hornet Clearwings, and Wood or Map-winged Swifts. Also Privet, Hawk, or Puss Moth, for large Elephant Hawk.—H. H. O'Farrell, 10, Douro Place.

FERNS, Seaweeds, Butterflies, &c., offered in exchange for Greenhouse and Garden Plants.—Address, Clianthe, Post Office, Teignmouth.

ASPLENIUM MARINUM.—A plant of this for a plant or cuttings of *Solanum pseudo-capsicastrum*.—E. C. I., Eldon Villa, Redland, Bristol.

FOSSILS FROM THE LESSER OOLITE, &c., given in exchange for mounted objects.—Address, W. A. G., 10, Parkshot, Richmond, Surrey, S.W.

RARE BRITISH PLANTS from Lancashire and elsewhere, for other species.—J. P. Lucas, Westminster Hospital, London, S.W.

UNMOUNTED OBJECTS.—Hairs (40 varieties), Sheep Ticks Fish-scales, &c. &c.—Send lists to W. Fletcher, Welford Road, Leicester.

POLYCYSTINA (Barbadoes) or Campylodiscus, mounted, for any other good object.—T. Buckle, Tunbridge.

"THE NATURAL HISTORY REVIEW AND QUARTERLY JOURNAL OF SCIENCE" (vols. v. and vi.) for Lepidoptera.—Address to A. B., 104, Bury New Road, Manchester.

DIATOMACEOUS EARTH from French's Pond, Albany, Maine, U.S., for good mounted objects.—Address, "American," care of Editor of SCIENCE-GOSSIP, 192, Piccadilly, W.

FATTY ACIDS, AND FORAMINIFEROUS SAND, for exchange. A. L. 61, Buckingham Road, W.

FOUR MOUNTED SLIDES, offered, for one each of the Harvest Bug and Itch Insect (well prepared).—B. T., 57, Lowther Street. Whitehaven.

BOOKS RECEIVED.

"Cottage Hospitals," their Objects, Advantages, and Management, by Edward John Waring, M.D. London: Churchill & Sons.

"The Naturalist's Circular," December, 1867. London: Henry Hall.

"Quekett's Lectures on Histology," 340 Illustrations. 2 vols. in one. 8vo. Wheldon. London.

"Remarks on the Climate of Sidmouth," by John Ingleby Mackenzie, M.B. London: Churchill & Sons.

"Rain: How, When, Where, Why it is Measured," by G. J. Symons, F.M.S. London: Stanford.

"The American Naturalist" for November, 1867. Essex Institute, Salem, Mass. U.S.

"ON SILICIFIED VEGETABLE STRUCTURES FROM THE ZAMBESI," by Dr. John Lowe. Lynn.

COMMUNICATIONS RECEIVED.—E. S. H.—J. B.—W. C. C.—P. Q. R. (no name).—C. H.—J. S. T.—W. H.—T. J. S.—H. W.—A. G. T.—J. B. W.—W. C. J.—S. E. E.—T. G. P.—W. W. S.—C. F. W.—L. M. P.—J. F. R.—P. W.—S. A. S.—H. E. W.—W. A.—C. A.—F. A. A.—R. B.—J. P. B.—B. T.—W. T. W.—G. B.—J. D. R.—G. B. (Bangalore).—L. T.—J. C. B.—W. M. P. R.—G. N.—E. C. J.—C. H.—J. G.—T. B.—J. B.—G. M.—W. V.—E. S.—A. W.—W. A. G.—A. M. M.—E. T. S.—T. W. W.—E. C.—E. H.—S. C. S.—E. A. W.—R. G.—W. F.—A. G. T.—H. L.—A. T. B.—G. B.—B. T.—S. S.—J. L. M.—J. O.—M. L.—G. S.—W. G. S.—F. H. W.—W. W.—R. J.—J. J.—M. O.—T. P. L.—B. D. J.—D.—J. H. W.—F. S.—T. W. G.—J. B. L.—M. E.—G. S.—R. B.—M K.—W. R. M.—A. B.—H. J. (no name).—W. W.—H. E. W.—C. S. B. G.—A. L. B.—J. B.—J. L.—A. T.—B. T.—R. S.—W. J.—M. M.—S. A. J.—G. W.—M. R. S.

IRRITABILITY AND SENSATION.

PERHAPS the most difficult problem which the student of Natural History can set himself to solve, is that which has reference to the heading of this paper; I mean the limits—if limits there be—between the muscular movements of an animal and those of a vegetable; between what we call sensation in the former and irritability in the latter.

Are Diatoms, Desmids, Volvocineæ, Oscillatoriæ, and a host of similar organisms, really vegetables? If so, how are we to distinguish between their movements and those of animals of apparently as humble a conformation? There may not be much rationality in the swinging motion of an Oscillatoria; but what shall we say of the Zoospores of the Algæ, which lash the water with their cilia precisely as do the Infusoria? or what, again, of many of the Diatoms (Naviculæ, Pinnulariæ, and other free species) which are seen to traverse the field of the microscope with so much ease and grace? Is all this mere mechanical irritability? If the supposed discovery of their movements being due to the contraction and expansion of an envelope of sarcode, be confirmed, we shall have to change our ideas very considerably, I expect, regarding this wondrous family, which has so often been obliged to shift its quarters from one kingdom to the other.

Is the question nearer a solution when we leave this debatable land and pass up to plants and animals of a higher organization? I scarcely think so. It is not worth while, perhaps, to bring forward, as an instance of voluntary motion, the perseverance of a plant in turning leaf and branch in the direction of the light; or its unvarying efforts to spread its rootlets only where the ground is moist and soft. This seems wonderfully like perception; but in point of fact it is simply the effect of growth. A nearer approach to real sensation is seen in the power possessed by many plants of closing leaves and flowers at given periods or under certain circumstances. Every night the common clover folds its leaflets together; and the daisy draws its ray florets close around the disk, so as to form a canopy and protection. Indeed, so regularly do many plants shut and open their petals at different periods of the day, that a "Floral Clock" has been constructed denoting the hour by the expansion or contraction of certain flowers. Others, again, are dependent on the state of the atmosphere for the unfolding of their petals. The bindweed, the chickweed, the scarlet pimpernel, and some others, invariably close their petals, as if to shelter the organs of fructification, before a threatened storm; indeed, so accurately does this last-named plant perform this function, as to have gained for itself the name of the "Poor Man's Weather-glass." Few botanical students are ignorant of the movements in the leaflets of *Desmodium gyrans;* and fewer still, probably, have failed to witness the graceful manner in which the sensitive plant (*Mimosa pudica*) shrinks at the slightest touch. A plant nearer home, and therefore more accessible—the berberry—exhibits a similar phenomenon as distinctly, though not so conspicuously, as does the Mimosa. In this shrub, the stamens, in their normal condition, lie back closely pressed against the yellow petals. No sooner, however, is a filament touched in the slightest degree, as it frequently must be by the legs of bees and flies, than it flies upwards with a distinct jerk, and presses against the stigma. Strange to say, the plant loses this property if exposed to the vapour of chloroform for a short time; exactly as an animal under similar conditions loses its function of sensation, to be restored when the exciting cause is removed.

But perhaps the most animal-like of all these

singular plants is the Venus's Fly Trap (*Dionæa muscipula*), whose broad flat leaves, studded with stiff hairs, close suddenly together as soon as any small insect alights on them, and clasps the wretched victim in an embrace of death; for it is only when the little prisoner has ceased to struggle for its freedom, that the two surfaces begin to relax their grasp, and return to their former position.

There is a remarkable fact connected with all these mysterious movements—viz. that they depend in a great measure on climate and temperature—not altogether for their existence, but certainly for the feebleness or activity which they display. Thus, in the hottest parts of the tropics, masses of *Mimosa pudica* fall prostrate before the advancing foot of the traveller; the sensitiveness with which the plants are endowed being communicated from one to the other faster than an ordinary person can walk. But let the same plant be transported to an English greenhouse, where it vegetates and nothing more, and it will barely acknowledge the contact of the hand by the drooping of its leaflets.

Again, we are told by a recent traveller (Dr. Jameson) that there is a small gentian (*G. sedifolia*) to be found on the lofty plains of Peru, which at 15,000 feet above the sea level is gifted with a peculiar sensitiveness to touch—a quality almost entirely wanting in specimens growing at a lower level.

What then are we to say to these instances? Are we to suppose that plants are endowed with some kind of perception? Or are we still to retain the old distinction, which assigns sensation to animals, and irritability (whatever that may mean) to plants?

W. W. SPICER.

HAIR OF INDIAN BATS.*

FOR five-and-twenty years an object has been known to microscopical observers as the "hair of Indian Bat," and during that period, if efforts have been made to discover its source, those efforts have not been crowned with success; for it is still unknown what species of bat yields the hairs which are employed as test objects. Full of hope that this species might be discovered, the investigations which led to the production of this paper were undertaken. Facilities occurred for examining the hairs of a large number of well authenticated species of Indian Cheiroptera, and the result of this examination forms the subject of the present communication.

The first observer who appears to have paid any special attention to Bat Hair, or at least the first who made any mention of the hair of Indian Bat, was Mr. John Quekett in a paper read before the Microscopical Society of London on the 20th of October, 1841, and printed in the first volume of the Society's Transactions (page 58). Towards the close of this paper its author observes—"Since these observations were made I have been kindly favoured by Mr. Powell with some hair of a bat from India, the species of which is at present unknown. The scales are most remarkably developed, and in some of the hairs they surround the shaft in a continuous whorl, and, without any preparation by scraping, in many places they will be found to be entirely wanting, whilst in others they are still attached to the shaft, but out of their proper position." This paper is accompanied by a plate in which the best figure of the Bat-hair in question is given which has hitherto been published. In his "Treatise on the Microscope," Quekett gives another and different figure of the same kind of hair, but much less accurate. In the latter instance the scales are represented as a series of whorls of linear scales, or at least so deeply cut as to have that appearance, an arrangement which is exceedingly doubtful either in Bat-hair or that of any other known animal which has hitherto been examined.

Dr. Carpenter, in his excellent work on the microscope, alludes to the hair of this Indian Bat in the following words, "it has a set of whorls of long narrow leaflets (so to speak) arranged at regular intervals on its stem" (pp. 644, fig. 329c, 1857). The authors of the "Micrographical Dictionary" appear to hold the same opinion of its structure. Dr. Hogg in his figure exhibits Dr. Carpenter's theory, and in his remarks quotes Quekett. In Griffith's "Text-Book for the Microscope," the author writes—"in the hairs of some of the foreign Bats the scales are whorled, forming very beautiful objects." In Willkomm's "Die Wunder des Mikroskops," the figures of which are singularly enough identical with those in "Hogg on the Microscope," the hair of the Indian Bat is given without special remark. As one of the "curiosities of microscopical literature," it may be remarked that the figure given in Fonvielle's "Les Merveilles du Monde Invisible" as the "hair of a bat" is that of the larva of *Anthrenus*.

The most satisfactory account, because the most correct and explicit, is that given by Mr. P. H. Gosse in his "Evenings with the Microscope." Writing of the hair of a species of Bat from India, he states, "the trumpet-like cups are here very thin and transparent, but very expansive; the diameter of the lip being, in some parts of the hair, fully thrice as great as that of the stem itself. The margin of each cup appears to be undivided, but very irregularly notched and cut. In the middle portion of the hair the cups are far more crowded than in the basal part, more brush-like, and less elegant, and this structure is continued to the very extremity, which is not drawn out to so attenuated

* Abstract of a paper read by Mr. M. C. Cooke at the Quekett Microscopical Club, January 24, 1868.

a point as the hair of the Mouse, though it is of a needle-like sharpness. The trumpet-shaped scales are, it seems, liable to be removed by accident; for in these dozen hairs there are several in which we see one or more cups rubbed off and in one the stem is destitute of them for a considerable space. The stem so denuded closely resembles the basal part of a Mouse's hair in its ordinary condition."

Any one who will take the trouble to examine carefully the hairs mounted and sold by Mr. Topping (fig. 10), must agree with Mr. Gosse, and discard all notions about "whorls of scales" and also cease their faith in all figures which so represent them.

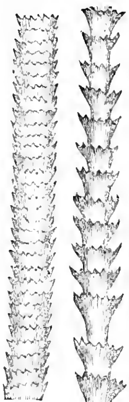


Fig. 10.
Mr. Topping's hair of Indian Bat × 300.

The only positive historical information respecting the introduction of these hairs is contained in a letter from Mr. H. Janson, in which he writes —"I have every reason to believe that I was the means of first introducing this object to the microscopic world, and thus it was: One of my immediate neighbours, now many years ago, was an old Indian officer, named Major Godfrey, who had lived twenty-five years there, and who had a strong turn for natural history. He brought over with him an immense load of mammalia, birds, &c. I having told him that the hairs of various animals were interesting objects for the microscope, he said, "I'll send you over a lot of them." Accordingly he sent me a pinch from a considerable number, on examining which I found some good things, and some of not much microscopical value, but on coming to the hair of the Indian Bat I was literally astounded, and exclaimed that I had never seen any hair equal to that. But to describe the Bat itself, which I have had in my hand. It was not larger than the common English Bat, but was remarkable for the length of its tail, which was, I should think, full three inches long, and was known in India as the Long-tailed Bat. I sent a specimen to Mr. Powell (long before his union with Mr. Lealand) and he said he had never seen anything like it before." The hairs which Mr. Janson possessed and which were distributed by him amongst his friends differ in no respect from those usually sold as "The Hair of Indian Bat."

Three catalogues have been published at different times, containing more or less complete lists of the Bats of South-eastern Asia, or India and the countries contiguous thereto.

I. Dr. J. E. Gray's List of the specimens of Mammalia in the collection of the British Museum. London: 1843.

II. Dr. Horsfield's Catalogue of the Mammalia in the museum of the Hon. East India Company. London: 1851.

III. Mr. Edward Blyth's Catalogue of the Mammalia in the museum of the Asiatic Society of Bengal. Calcutta: 1863.

In Dr. Gray's list are the names of 47 species of Indian Bats; in Dr. Horsfield's catalogue 34 species; and in Mr. Blyth's catalogue (including desiderata) 73 species. In one list some species occur which are not found in the others, and some probably which may be only varieties, but, taking them as they stand, excluding all which are quoted as synonyms, and accepting those which the authors regard as distinct, we have, on a comparison of the three lists, about 90 species distributed amongst 24 genera. Inasmuch as Mr. Blyth's catalogue is the most recent, and taking into account the advantage he possessed of residence in India, and of personal acquaintance with many species whilst living, it will doubtless be the most accurate. Not more than half the species enumerated have hitherto been examined, although this includes species in nearly all the genera represented in continental India. Most of the species, the hairs of which are still unknown, are not found in India proper.

Taking the species in the order in which they stand in Mr. Blyth's catalogue, and dividing them, *not* strictly according to their zoological families, but, as suggested by the structure of their hair, we have six groups.

The first group includes the *Pteropi* only, or the large frugivorous bats belonging to the genus *Pteropus*. There are four species enumerated for Indian countries, of which two only have been examined. The Kalong of Java (*Pteropus edulis*) found also in Tenasserim, and the Wawul of the Malays (*Pteropus Edwardsii*) which is found in India generally. The dimensions of these bats are given by Dr. Horsfield as five feet in expanse, with the length of the body at one foot, whilst Colonel Sykes declares that these dimensions are too small, and that he has seen them fourteen and a half inches long in the body. The hairs are large, and nearly smooth on the surface, the cuticular plates or scales are closely appressed, and the medulla is distinctly visible, especially when mounted in balsam (fig. 11). The hairs of the Wawul have larger scales than the other species, and their longitudinal divisions are scarcely apparent. The diameter of the hairs of the Pteropi is double that of the hair of any other species herein enumerated.

The second group is characterized by the large medulla of the hair, and includes three genera. The Dog-bat of Java (*Macroglossus minimus*) though grouped scientifically with the *Pteropi* has hair more closely resembling that of the Vampire (*Megaderma*). The same remark applies also to the genus *Cynopterus*. The scales on the hair of the

"Dog-bat" are nearly cylindrical, expanding upwards, and entire at their margins. In balsam, the medulla is distinct and large. Mr. Blyth recognises but one species of Cynopterus, which includes the

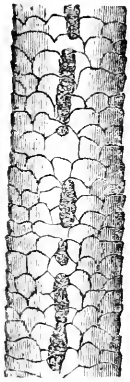


Fig. 11. Hair of Pteropus edulis × 300.

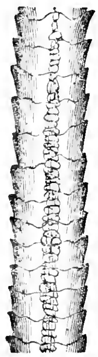


Fig. 12. Hair of Cynopterus Horsfieldii × 300.

three species enumerated by Dr. Horsfield, and two of those enumerated by Dr. Gray. The appearance of the hairs seem to indicate a distinctness between the species called *Cynopterus marginatus* (fig. 13) and that named *Cynopterus Horsfieldii* (fig. 12). The hairs

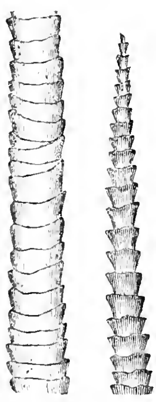


Fig. 13. Hair of Cynopterus marginatus × 300.

Fig. 14. Hair of Cynopterus marginatus in Balsam × 300.

in the latter are larger, the medulla is not more than half the diameter, and the colour is deeper, not to mention some other minor distinctions. When examined dry the hairs resemble those of the "Dog-bat" in the form and arrangement of scales, except that they are closer together. Mounted in balsam, they are most beautiful objects, being so transparent that the outline of the scales is lost in the front view, and seen only at the sides like barbs (fig. 14). The broad medulla in *Cynopterus marginatus* occupies more than three-fourths of the diameter of the hair. The other genus included in this group is that of the Indian Vampires (*Megaderma*) of which Mr. Blyth has given a graphic account in the Journal of the Asiatic Society of Bengal. Two out of three species have been examined, and these are so similar that it is difficult to indicate features whereby one may be distinguished from the other (figs. 15, 16). When examined dry, they bear considerable

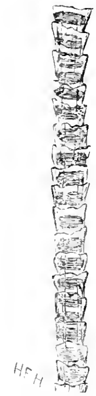


Fig. 15. Hair of Megaderma lyra × 300.

Fig. 16. Hair of Megaderma spasma × 300.

resemblance to those of Cynopterus, but the medulla is distinctly visible. If mounted in balsam or spirit, they become very transparent, but the apparent marginal barbs, which represent the side view of the scales are shorter and less defined than in Cynopterus. The cells of the medulla are longer, and the general appearance as a microscopic object not so attractive.

The third group includes the Horse-shoe Bats, in which the hairs are very variable in size from the

Fig. 17. Hair of Rhinolophus perniger × 300.

Fig. 18. Hair of Rhinolophus Rouxi × 300.

Fig. 19. Hair of Rhinolophus diadema × 300.

same animal, some being one-half, or one-third the diameter of others, with a very irregular or zigzag outline, whilst the larger hairs are furnished with cylindrical scales expanding upwards, irregular in size, and often with an oblique margin. The two

genera of *Rhinolophus* and *Hipposideros* cannot be distinguished by their hairs, and indeed many zoologists seem to be in doubt whether the one should not be regarded as a sub-species, or section of the other. There is a very great similarity in the

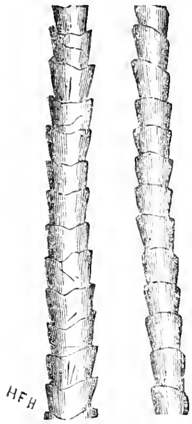


Fig. 20. Hairs of Hipposideros nobilis × 300.

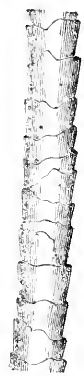


Fig. 21. Hair of Hipposideros larvatus × 300.

hairs of the eleven species of the two supposed genera examined (figs. 17 to 22). All these exhibit no trace of medulla either dry, or mounted in balsam. The single species of *Nycteris* is associated with this group, with which it agrees in many particulars. Mr. Tomes has expressed the opinion in the proceedings of the Zoological Society, that it is only a modification of Rhinolophus. When mounted in balsam the margins of the scales are much more distinct in *Nycteris* than any species of Hipposideros or Rhinolophus (fig. 23).

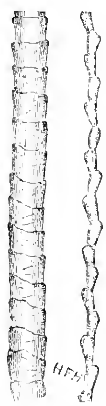


Fig. 22. Hairs of Hipposideros murinus × 300.

Fig. 23. Hair of Nycteris Javanica × 300.

The fourth group is of most interest to the microscopist, since it includes those hairs which have the margins of the scales jagged, toothed, or serrated, and consequently the veritable "hair of Indian Bat." As far as the specimens examined are concerned it includes the genera Rhinopoma and Taphozous. It might be termed the group of long-tailed Bats. The genus Rhinopoma has one representative in India, and one in Egypt, which Mr. Blyth suspects are identical. The hairs of both are very similar. The Indian Rhinopome (*Rhinopoma Hardwickii*) has a tail extending two inches and a quarter beyond the membrane, and hence its entire length would not fall short of three inches, the length quoted by Mr. Janson. Unfortunately, however, the only hairs of this species yet examined

Fig. 24. Hairs of Rhinopoma Hardwickii × 300.

Fig. 25. Hair of Taphozous melanopogon × 300.

were from a small tuft taken from the back of a single specimen, and these are certainly not identical with the hairs which are required to be identified, the scales are smaller, less cup-shaped or spreading, and the shaft appears to be thicker (fig. 24). It would be rash, however, to affirm that this species cannot furnish the coveted hairs, since some other portion of the body, or the other sex, may possess them,

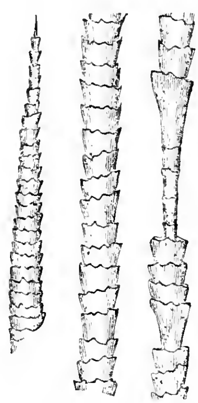


Fig. 26. Hairs of Taphozous longimanus × 300.

Fig. 27. Hair of Nyctinomus plicatus × 300.

although appearances are against such an issue. Of the three species belonging to the other genus (Taphozous) two have been examined, and the hairs

of these are similar to those of the Rhinopomes. The long-armed Taphozous (*Taphozous longimanus*) is common about Calcutta (fig. 26), but the black-bearded Taphozous (*Taphozous melanopogon*) appears to be less common in peninsular India (fig. 25). The hairs of the latter have the scales less deeply and positively serrated at the margin than in the Rhinopomes, and both appear to be further removed in structure from the undetermined hairs. In this group must be placed also the hairs of *Nyctinomus plicatus*, or groove-cheeked Bat, although the margins of the scales are waved and irregular rather than serrated (fig. 27). Two species of this genus are enumerated, but the other (*Nyctinomus insignis*) appears to be really Chinese.

The fifth group includes the genus *Nycticejus*, all the species of which seem to possess hair of a very similar character. It is in fact difficult to indicate any specific features, whilst generally, or in as far as the whole group is concerned, they possess a character which appears to be peculiar to them. The outline of the hair is deeply serrated, and the

Fig. 28. Hair of Nycticejus luteus × 300.

Fig. 29. Hair of Nycticejus castaneus × 300.

scales are irregular but very indistinct (figs. 28, 29); when mounted in balsam there is the appearance of imbrication, which may result from the great transparency of the hairs. In the four species examined great difficulty was experienced in making out distinctly the form of the scales, and in this all the species agreed. No trace of medulla was visible. The figures are those of two species, *Nycticejus castaneus*, which inhabits Malayan countries, and *Nycticejus luteus*, a species very abundant in many parts of India.

The last group is a large one, and contains the small Bats comprising the greater portion of the family Vespertilionidæ, including the genera Scotophilus, Lasiurus, Kerivoula, Vespertilio, and Plecotus. The margins of the scales are usually oblique, darkened by deposits of pigment, and, especially in Plecotus, only partially surround the hair, and are alternately arranged upon the shaft. The serratures on the outline of the hairs are seldom opposite, and the hairs themselves are slender. In many cases there is the *appearance* of a spiral arrangement, but this view is clearly deceptive and originates in the oblique margins of the scales. A true spiral arrangement can in no instance be really determined.

Zoologists are not wholly agreed amongst themselves as to the limits and distinctions of the genera in this group. One calls Lasiurus a Vespertilio, another calls a Kerivoula a Vespertilio, and another charges a fourth with making a Scotophilus a Kerivoula, whilst a fifth removes a Vespertilio to a new genus, and gives it a new name. This uncertainty evidences the close alliance of the genera, which the microscopical appearance of the hairs corroborates.

Our space forbids further and technical details of the distinctions of the hairs in this group, of which we give two or three illustrations. The hairs of the "Madras Bat" (*Scotophilus Maderas patensis*) (fig. 30) represents the general character in the hairs of Scotophilus. Fig. 31 is the hair of the one species of Lasiurus known as *Lasiurus Pearsonii*. The Kerivoulas are represented by the hair (fig. 33) of the typical species (*Kerivoula picta*). The genus Vespertilio is similar in the structure of its hairs, as seen in fig. 34; and *Plecotus homochrous* and *Plecotus Darjelingensis* (fig. 32) are undoubtedly only varieties of the British Great-eared Bat (*Plecotus auritus*).

Fig. 30. Hair of Scotophilus maderas patensis × 300.

Fig. 31. Hair of Lasiurus Pearsonii × 300.

Fig. 32. Hair of Plecotus Darjelingensis × 300.

The genera which still require to be examined, are Xantharpyia, which has only a Malayan representative; Noctulinia, which is also British; Murina, which has one species in the Himalayan region; Myotis, which has five species, one of which is British; the common Barbastelle, which is British as well as Indian; and *Nyctophilus* *Geoffroyi*, a European species. The hair of Cheiromeles is so

short, that the animal appears to be naked, and as its Indian species is confined to Sumatra, its omission can scarcely be of much importance.

Of the known genera and species which have not been submitted to examination, there is not one which could be suspected of yielding the hairs with "trumpet-shaped scales." If these hairs are really the produce of a species of Indian Bat, of which there seems no just ground for scepticism, and if they are not obtained from one of the species of Taphozous or Rhinopoma, the only conclusion which can be hazarded, is that the species is one not yet recognized by zoologists.

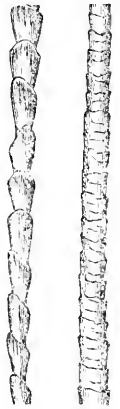


Fig. 33. Hairs of Kerivoula picta × 300.

Fig. 34. Hairs of Vespertilio imbricatus × 300.

In the examination of these hairs a quarter inch and one-eighth, objectives were employed. All the hairs were examined dry, in water, and in balsam, and many were mounted in spirit. The true character and arrangement of the scales is best seen when the hairs are examined dry, many appearances which they present when seen in balsam being deceptive, occasioned by the great transparency which it communicates to the delicate scales. However much the use of polarized light may be deprecated as a pretty toy, it is a valuable adjunct in such examinations as the foregoing, and often aids in correcting the deceptions caused by mounting in balsam.

Although forty-five species, and varieties which have been regarded as species, have been examined, it is advisable that the investigation should not close here, and, in order to assist any one desirous of pursuing the subject to a more completely successful termination, the reader of this paper, at its close, presented to the Club a complete series of the hairs examined, mounted dry and in balsam, to the number of one hundred slides,* as well as the forty-five large diagrams employed on the occasion.

* N.B. The figures illustrating this paper were drawn on wood from the slides by Mr. H. F. Hailes, and confirm, independently, the views of the writer.

CONCERNING BUGS.

I SHALL be glad to add a little to the remarks of Mr. Smith on Bugs, which appeared in a late number of Science-Gossip. I am sorry to say that upon several occasions my experience has been very bitter, on account of the liberal allowance of these little pests in apartments which I have temporarily occupied.

Many people, perhaps, are unaware of the etymology of the word *bug*, or imagine it has never been used except as indicating some of the members of the insect tribe. This is a great mistake. It is an old Celtic word, not pronounced with the short *u* as at present, but like the Welsh *bwg*; and this, again, is identical with what you hear among the lower orders, in the greater part of Yorkshire, for they sound it as if spelt *boog*. Hearing what is commonly called the vulgar, though very frequently the more correct, pronunciation of a word, will often give some clue as to its origin or meaning; and it is so in the present instance. Formerly, our ancestors called a ghost, a goblin, a spirit, or spectre—anything which they dreaded but could not understand, a bug (*boog*). The word doubtless has its origin from the close approximation in sound to the moaning of the wind, which in remoter and more superstitious times was put down to the spirits of the departed. Under these circumstances, one can readily understand that persons feeling thus terrified would coin some word indicating, and imitating also, the sound which caused their fears; thus, *to boo* would be to frighten; *bug* (boog), that which frightens; *booby*, one easily frightened, &c. Who does not remember, when a child, and groping through some dark passage, the momentary fear caused by the terrible *boo* of some concealed companion? And this suggests another idea: a word often retains its hold in the nursery, and lives there after it has been disclaimed by man generally, and would otherwise become obsolete. It is so now with the word *bogey*, which is nothing more nor less than bug in another form; modified for nursery purposes, and used to startle children into that propriety which they might otherwise lack.

I am strongly disposed to suspect that the American word *bogus*, too, has really its origin from the same source; at any rate, the meaning would suggest it, as it is applied to anything unreal, unsubstantial, or partaking of the nature of a sham; so that from one end of the States to the other, you may hear of bogus jewelry, bogus houses, and bogus statesmen. I know it has been traced to another origin, but I very much doubt its correctness.

In the writings of Locke, Pope, Shakspeare, and others, the word *bug* may be met with in its original sense. The last-named poet makes Hamlet say, in the 5th act of that play:

"With, ho! such bugs and goblins in my life."

And King Edward, in "Henry VI:"

"For Warwick was a bug, that fear'd us all."

And again in the "Winter's Tale," when Hermione is threatened with death, she says:

"Sir, spare your threats,
The bug, which you would fright me with, I seek."

In Matthew's Bible, we find in the 91st Psalm: "Thou shalt not need to be afraid of any bugs by night;" and by substituting the word *terror* in recent editions, most of the original force of the passage is lost.

To return to the insect in question, it is probable that it was introduced into England somewhere about the close of the fifteenth or commencement of the sixteenth century; before that time, if it existed at all in this country, it was comparatively rare. The first mention made of it is by Mouffet, who speaks of two noble ladies fearing that they had got the plague, after having been bitten somewhat severely by this insect. This was in 1503, and it was then known by the name of Chinche, or Wall-louse; and not until some time after, when they had given good proofs that they might be looked upon *par excellence* as the "terror by night," was the word *bug* transferred to them.

The species of Bugs are very numerous, belonging to the sub-order Heteroptera,—the Land-bugs (Geocorisæ), and Water-bugs (Hydrocorisæ), forming its two sections. The former may be again divided, according to the nature of their food and their modified suctorial apparatus; in the vegetable feeders the rostrum being more slender, and composed of four joints, whilst those which prey upon animals have a stouter rostrum, with only three joints; and to this belongs the one in which we are most interested, the *Acanthia lectularia*, which enters into our dwellings, infests our houses, tortures our bodies, and robs us of our nocturnal slumbers. Odious, however, as it is in appearance, disgusting both in its odour and associations, and terrible in its inflictions, yet, when compared with some of its relations, it might almost be looked upon as a harmless and inoffensive creature. Those found in tropical regions attain a much larger size, the poison they instil into the wounds they make is far more active, and they are consequently much dreaded by the inhabitants. La Pierre speaks of one found in the Mauritius more venomous than a scorpion; its bite being followed by a tumour as large as a pigeon's egg, and lasting for four or five days. I have seen the renowned Persian Bug, and have been told that its bite is followed by death in a few hours, though I should imagine this statement is somewhat exaggerated; it is nevertheless such a villanously diabolical-looking thing, that I am quite sure it would wish such a result to follow. The Benchucha, or Great Black Bug of the Pampas, is said by Mr. C. Darwin to be far worse than our Bed-bug; and another, the *Reduvius serratus*, or Wheel-bug of the West Indies, if placed on the hand, gives a kind of electric shock which may be felt as high as the shoulder. It may, I think, be laid down as a rule, that there is a direct relation between the temperature of a climate and the size, variety of colour, and poisonous properties of its insects. I speak feelingly too, when I say that a bug-bite is more unendurable in a summer than in a winter's night; and I am not sure whether the increased activity of the poison they inject (due to the increased temperature of the season) is not the principal factor in the increased annoyance which they cause.

I think it probable that the corpses your correspondent found in the corners of his room were the skins which are cast off at certain periods; or, if veritable corpses, that their deaths were due to other causes than cannibalism.

These insects, with some others, as cockroaches, spiders, &c., are the subjects of incomplete metamorphosis; that is, in the pupa state they so nearly resemble the perfect insect, both in form and habits, in eating and moving; and the changes they undergo in external and internal modifications are so slight, that they might appear at first sight more nearly allied to those of some crustaceans than to the complete metamorphoses of the higher insects. I am aware it is next to impossible to prove a negative, but I have placed upwards of a dozen of these creatures together in a bottle, some in the pupa state and others in the perfect form, and after watching them frequently for several days, I never saw anything like an attack upon each other, or an attempt to appease their hunger, if they felt any, by a feast upon their companions; I think, if they had done so, there would have been extenuating circumstances, as they were simply lodged, not boarded; they, however, appeared to live amicably till the last moment, when their corpses sank down side by side at the bottom of the mortuary bottle.

If, however, they do not eat each other, there are bugs of other species which certainly eat them; and for this reason I bring forward, with profound respect, the *Reduvius personatus* and the *Pentatoma bidens*. The former is said to be particularly fond of the Bed-bug, and, according to Kuhne, six or eight of the latter, in a few weeks, completely cleared a room which before swarmed with them.

In houses where bugs abound, little is seen of them in the daytime, or if, perchance, some solitary individual is discovered, he generally appears to be hurrying to some place of concealment, or else is found resting in some dark spot, where he vainly imagined he would never be disturbed; as in newspapers, between linen, &c.; but

"Soon as the evening shades prevail"

out they come, in countless numbers, from cracks in

the walls and ceilings, from behind the paper-hangings, from the joins in the flooring, out from under the carpets, out from the chinks in the crazy furniture, out from everywhere; and then they troop about, rushing hither and thither, and covering everything. This state of affairs lasts only for a few hours, and soon after midnight not one is to be seen, though I dare say they might be readily found by seeking after them in the cracks and crevices.

I certainly did not believe any place could be so thoroughly swarmed with them as I had heard, till a few years since. I was then holding office at an hospital, and in the course of my duties it became necessary for me to pass some hours in, I should think, one of the oldest tenements of the worst part of Lambeth. I had paid a visit several times during the day, and was on the look-out for specimens, for we are sworn foes, but saw none; in the evening, however, soon after the dim lamp was lighted, I chanced to look round to where close beside me was a small table covered with a white cloth (?), and I should think there were some hundreds upon it, of different sizes, from the pallid infant to the rotund matron and portly sire. As soon as I could realize the fact, I began to inspect my garments, and was horrified to find the siege had already commenced: some were ascending my trousers, and there was a patch of six on my waistcoat that I could have covered easily with a half-crown. They were everywhere,—on ceiling, walls, and floor; I scarcely think you could have put a foot down anywhere without killing some; and the worst of it all was, they seemed to recognize my presence, and make for me; and in a very short time I was in a dreadful condition with the irritation and bites of these little torments; I might, literally, be compared to Bishop Hatto, who was attacked by vermin, though of a different kind; as the story runs:

> "And in at the windows, and in at the door,
> And through the walls by thousands they pour,
> And down through the ceiling, and up through the floor,
> From the right and the left, from behind and before,
> From within and without, from above and below,
> And all at once to the bishop they go."

We are further told that "they were sent to do judgment on him" for taking human life; but as I had taken up my post, and held it through the night, for just the reverse, I think it was a mistake they did not receive special instructions to leave me alone.

I forget the exact time, but it was not long after midnight, when they vanished, quite of a sudden, and I did not see a single one afterwards.

It would be a great blessing if something could be discovered that would rid a place of them easily, —something that they would eat which would cause their death. Plenty of things will kill them, if you can only persuade them just to get in. Liquor Potassæ will kill them instantly, as salt and water may; but what can you do with either in a bedroom? You cannot apply it to the bed or bed-linen, or to a papered wall, or pour it with impunity into every crack in the floor; and if you could, you would still have bugs, for you would not reach them all. I have tried experiments with various remedies reputed infallible, and they have most of them miserably failed. I got some Persian vermin-killer,—a powder which was to be strewed about their haunts, and it was dusted on the floor, on every shelf, into cracks in the walls, everywhere in fact, without any apparent effect. I then put some in a bottle with two or three bugs; but they climbed over it, and into it, and never manifested the slightest inconvenience. I also tried corrosive sublimate, and flowers of sulphur, in the same way, with the same result. Only one experiment terminated fatally, and that was when one was shut up for about six hours with a little lump of camphor. I had heard that stoving a room with sulphur was a certain cure, so my room was twice subjected to that process; but on the second occasion two or three bugs, in an open bottle, in one corner of the room, evinced no symptoms of being in the least inconvenienced; and next time I passed a night in the room, they were more numerous than ever. I tried the last experiment again on a smaller scale, and enclosed one in an atmosphere of sulphurous acid for some time, and I believe he rather preferred it.

Most of the bug poisons that are sold, in my opinion, are useless, unless you can take the insect by the back of the neck in one hand, and apply the poison with the other. The way in which my room was cleared, after all other things had failed, though entailing a little more trouble and expense, is nevertheless, I believe, the only remedy. The walls were stripped, and every crack in them and the ceiling plastered up; and in like manner every join and little hole in the flooring was filled with mastiche cement, which soon turns almost as hard as stone; and from that day not a vestige of one has been discovered.

To conclude: with regard to these insects, the question *cui bono* naturally arises, as it does in reference to so many of nature's works and ways, which we cannot understand. To say, as is generally done, that they are designed to make people clean, is simply absurd; for it is always found that the dirtier people are, the less they care for them; in fact, I have seen persons perfectly indifferent to them, who take no notice if they are crawling over them, or at most brush them on to the floor: they are protected against their bite by the dirt which "wraps them round as doth a garment;" and further, I believe if a man were sufficiently dirty, he might take his fee and enter the far-famed bug ward of the Banian Hospital with impunity; yes, and lay him down, and sleep in peace, and dwell in safety, none daring to make him afraid.

Nature is no bungler in her work, and if we would seek successfully into her secrets, we must first acknowledge that which is the foundation of all her laws, viz., that if she designs anything as a means to an end, that end will infallibly be accomplished; and therefore, as we find that the multitude of bugs do not incite to cleanliness in the houses they infest, we may reasonably infer that that was not the end for which they were created.

F. H. W.

THE "UNITY" CONTROVERSY ENDED.

MR. MILTON, in the introduction to his last paper, professes his desire "to serve the interests of *truth*;" I am therefore the more surprised that he should have so greatly misrepresented my views. Doubtless Mr. Milton finds such a course conduce to the *éclat* of his *critiques*; but it is as unworthy of a scientific man as are paltry quibbles about questionable grammatical constructions, which, even if substantiated, would not invalidate a single argument or disprove a single fact. I will not occupy the pages of SCIENCE-GOSSIP with a laboured exposure of Mr. Milton's logic (?), or defence of my own theories; but will point out, as shortly as possible, where he has most egregiously mistaken my meaning.

I never stultified myself by dividing mankind first into three, and then into two classes, in one sentence, as he asserts; I intimated, clearly enough, that while I considered the brown races to be white races becoming black, the transition took so long a time to effect, that the very state of change itself afforded all the necessary permanence to constitute the basis of a subdivision of mankind. Mr. Milton says that when I was asked,—What is to be done with races neither white, brown, nor black? I made no answer. This is incorrect, as he will himself see on reference to the beginning of my second paper. He thinks the term "extraordinary peculiarities" very vague; but I used it in close connexion with the words "a dark skin," &c. He considers my quotation from Professor Huxley "irrelevant," because it supports my views and demolishes his. He denies that he ever quoted the Egyptian paintings as authorities; yet in his first essay we find the following passage:—"They (Lubbock, &c.) were puzzled to know how it happened that on monuments in Egypt, which cannot be set down as later than 2,400 years before Christ, the Negro appears as he is seen in our day." They certainly appear to be cited in this extract as acknowledged authorities. He denies that black races are generally degraded, morally, mentally, and physically, as I asserted; and instances the usual half-dozen Negro celebrities in support of his denial. But he omits to notice the state of the Andamaners and Papuans, Australians, Californians, &c. And surely it is negrophilism, *pur et simple*, to laud the Negro, as he has, at the expense of the North American Indian, the Persian, and Hindu! If we compare the civilization attained by the most refined Negro empires, Ashanti and Haussa, it will appear perfect barbarism by the side of the ancient civilization of India and Persia; while even Mexico and Peru could, in ancient times, boast great sovereigns and generals; and it is very questionable whether the Milton-despised "braves," Oceola and Tecumseh, did not exhibit far greater ability, as national leaders, than Toussaint L'Ouverture, whose temporary successes were principally due to the deadly climate of Hayti. In literature the cleverest Negro is nowhere when compared with the Persian poets Ferdousi and Sadi—whose compositions even Sir W. Jones styled "a glorious monument of Eastern genius and learning"—and with those who wrote the sacred books of the Hindus.

But Mr. Milton's *critique* bears, like the scorpion, its sting in its tail. He makes out that if the Gipsies did not enter England till A.D. 1427, as I maintained, "there is, on 'F. A. A.'s' own showing, still ample time for the assimilation (*i.e.* of the Gipsy and English complexions) to have taken place; and it has not taken place." Now I regret to overturn this logical triumph; but I must ask,—Where does Mr. Milton find, in my essay, an estimate of the time required to change the hue of nations? And if he cannot produce the estimate —and I challenge him to do so—how can he found an argument upon "F. A. A.'s" own showing? It is true I have cited instances of nations changing colour in a comparatively short space of time; but this is a very different thing from laying down a law that any given nation will, irrespective of *habitat*, external circumstances, &c., change hue in a certain period. I may safely assert that I never attempted to do this. Mr. Milton's grand attack therefore fails. His scorpion stings *itself* to death, *sui generis*. I referred the origin of the peculiarities of the Negro race to the time when Africa was an island; and if Mr. Milton will again refer to a "good map," he will find that an elevation of the sea-level, sufficient to flood the Sahara, would also submerge the Delta of the Nile and Isthmus of Suez. Then, as to light-coloured races in Africa (a totally distinct question from the former), I said —Unless you can prove that the light race has dwelt where it is now located as long as the surrounding black races, you have not the *data* sufficient to prove that this instance forms an exception to my theory, as you suggest it does. Mr. Milton thinks that, according to my theory, the Negro ought to alter in America. Well, has he not become robuster and longer-lived? has he not lost, as I showed in my last, the capacity for resisting African diseases? If in forty years he has changed so much (for the

slave-trade has only been prohibited some forty years), what changes may we not expect in a few centuries? The quotation from M. Quatrefages sufficiently answers the objection derivable from those Negro monstrosities, the "Albinoes." I *did not* say that the Esquimaux were *white*, and yet that their *dark* complexion could be traced to a southern origin. My words clearly implied—Even if they are proved to be dark in colour, then we are at liberty to conclude that their hue arises from a southern origin. Lastly, Mr. Milton winds up by saying that I congratulate myself upon having "demolished" him. As I nowhere hint such a thing, I presume that Mr. Milton is giving us the benefit of his personal feeling in the matter, and to this, of course, I do not offer the slightest objection. On concluding a discussion which I never expected to be so prolonged, or to occasion such differences of opinion, I trust the readers of SCIENCE-GOSSIP will give me credit for having at heart the interests of scientific truth; and I await with confidence their verdict upon the *facts* which I have endeavoured to place before them.

F. A. A.

THE OXLIP.

IN Number 11 of the *Phytologist*, published in April, 1842, is a note giving an account of the conditions under which it had occurred to me to find the plant usually called "the Oxlip," and from those conditions inferring that the plant in question should be considered as a hybrid between *Primula veris* and *Primula vulgaris*. Since the date of that communication the soundness of the views there expressed has received much confirmation.

This note elicited, from various botanists, much information in the following numbers (12 and 13, to which your readers are referred) of the same journal, and enough was obtained to have satisfied most minds respecting these plants.

Seeing, however, that the subject is again opened up in your publication, I will endeavour to show how the confusion has arisen, and, if possible, how it is, in future, to be avoided.

The whole difficulty appears to me to be caused by a confusion having taken place as to what plant was intended to be designated by the popular name of "Oxlip." If, therefore, we can determine this we shall at the same time get rid of much of the confusion that exists.

Of the three allied species of the genus *Primula*, two, *Primula veris* and *Primula vulgaris*, var. *acaulis*, are common and well-known plants, and have respectively received the popular names of Cowslip, or Paigle, and Primrose. Between these two there is a third form, commonly known and generally, though not abundantly, distributed through the country. This would seem to be a hybrid between them, partaking more or less of the character of each parent. This form has been recognized by botanists under the name of *Primula vulgaris*, var. *caulescens*, and it is to this plant that the name of Oxlip properly belongs; having acquired such a name probably in allusion to its larger growth than the Cowslip. This is a plant sufficiently common to have had a popular name bestowed on it.

In a comparatively confined district, lying on the borders of Essex and Cambridgeshire, and not elsewhere, in England, as I am aware of, there occurs a third species, the *Primula elatior* of Jacquin, a plant which may be considered to be popularly unknown. However, to this plant the English name of Oxlip is given in *English Botany*, and by Hooker. Of this the figure (513) in *English Botany*, published in 1798, is a good and faithful representation. This is most undoubtedly a distinct species, and cannot in any way be considered as a hybrid. The locality from whence I have obtained a supply of this plant is a wood between Stanstead and Elsenham, of which I have the following note: "that it grows on a loamy gravel on chalk; not a primrose or cowslip near."

To this plant, another English name than that of Oxlip must be given to avoid the confusion that exists. That given, as a second name, in *English Botany*, of "Greater Cowslip," might be suggested; restricting the name Oxlip to the caulescent or hybrid variety of *Primula vulgaris*.

I forward a specimen of the true *Primula elatior*, Jacq., for your inspection and use, from the abovementioned locality.

H.

METAMORPHOSES OF INSECTS.

A LARGE and rather imposing work has just been published on this subject in Paris. It is entitled "Metamorphoses, mœurs, et instincts des Insectes (Insectes, Myriapodes, Arachnides, crustacés) par Émile Blanchard, membre de l'institut, Professeur au Muséum d'histoire naturelle." The volume consists of 716 pages of imperial 8vo., and is illustrated by 200 figures intercalated with the text of 40 page plates, of which we are enabled to give two on the following pages as examples. The publisher of this work is Germer Ballière, and its price is thirty francs.

We cannot, within the space at our disposal, give a synopsis of the contents of this volume, nor will the impressions of the plates equal those of the original which are separately printed on plate paper, but we can commend the work to all who are interested in insects as a good digest of the subject. Great expense has been incurred to produce the illustrations, which, in the majority of instances, are excellent, and the Professor of the Museum of Natural History is just the individual whom we should expect would accomplish his work well.

Our first plate (fig. 35) illustrates the history of

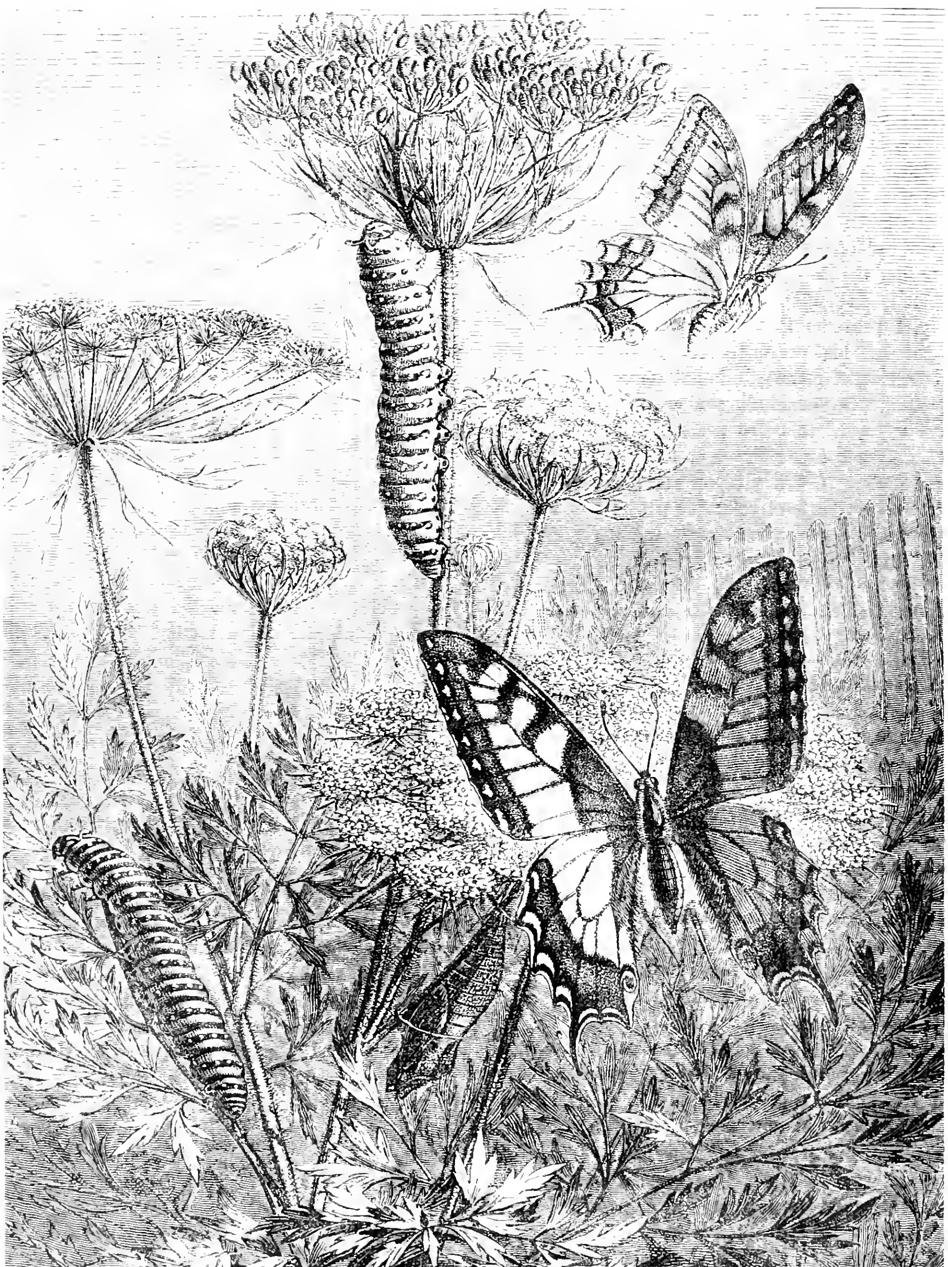


Fig. 35. The Swallow-tailed Butterfly (*Papilio Machaon*).

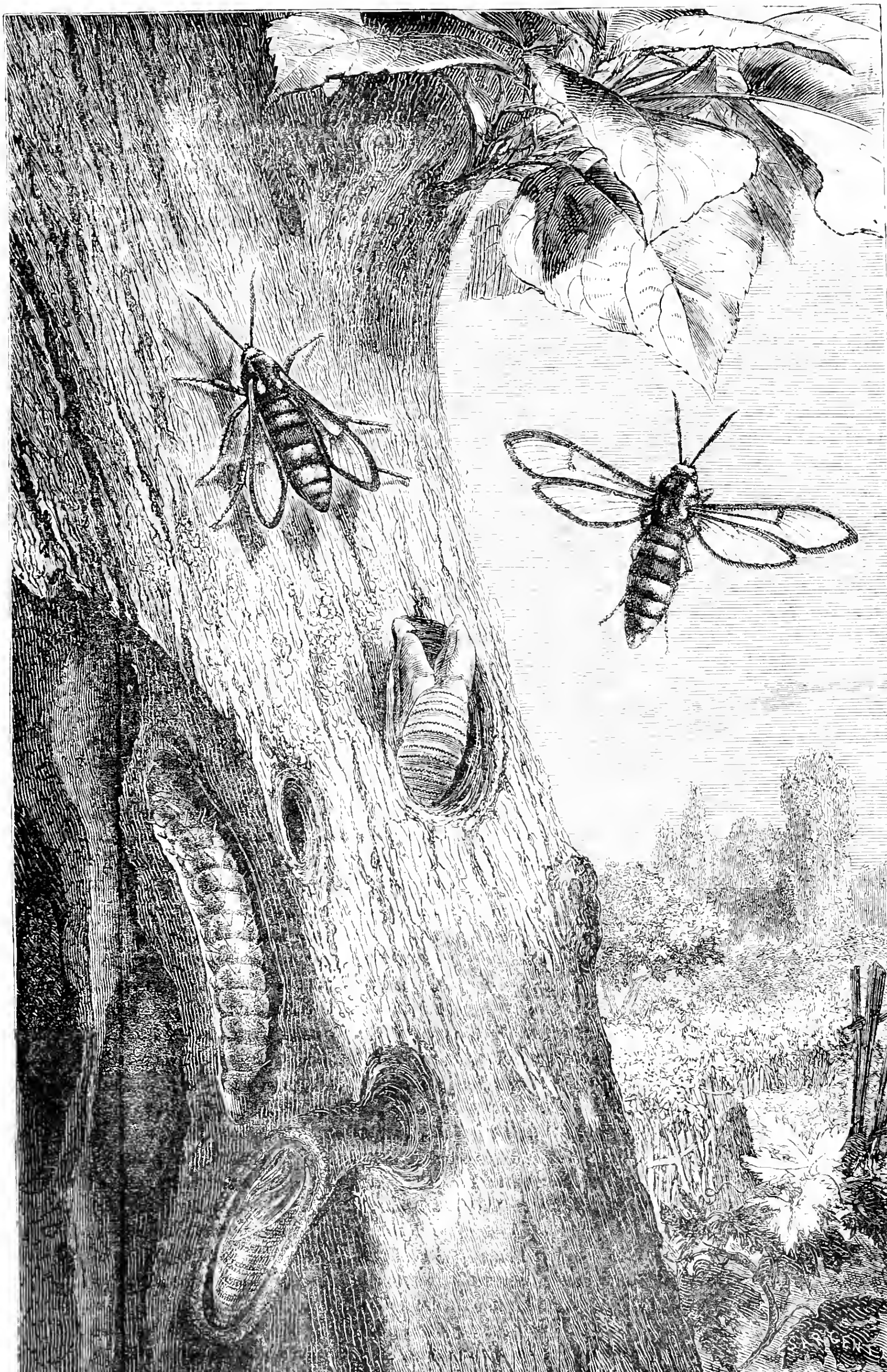


Fig. 36. The Hornet Clearwing (*Sphecia apiformis*).

the Swallow-tailed Butterfly (*Papilio machaon*) and its food-plant, the wild carrot. The three stages of caterpillar, chrysalis, and imago are all represented, and although the wings of the latter are displayed in a manner hardly peculiar to the insects which we have so often seen floating about in profusion at Horning Fen, they are undoubtedly in the orthodox position, as represented by the cabinets of French entomologists.

The second plate (fig. 36) represents the metamorphoses of the Hornet Moth, the *Spheria apiformis* of English entomologists, but named *Sesia apiformis* in the present work. It affects the trunks and roots of poplars in its early stages, and when mature its clear wings and banded body would probably mislead the novice into a belief that it was more closely allied to bees and hornets, than to butterflies or moths. The microscopist has not hitherto made the most of our indigenous species of "clear-wings." The present species has some very curious and interesting scales, and the brush-like scales which fringe the wings in nearly all the species are very quaint. The transparent, delicate, broadly ovate scales of the clear portion of the wings of *Trochilium tipuliforme* are hardly known in cabinets, whereas the transparency of the wings should render all the species favourites, for it increases the facilities for seeing the epidermal coverings *in situ*. If it was the ambition of Professor Blanchard to produce a pretty book he has undoubtedly succeeded, and as such it promises to become popular. Unfortunately *our* professors do not favour us with many popular books on natural history; perhaps they think it derogatory; certainly they have a prejudice against it, and so they leave the work of teaching the public to be accomplished by smaller men.

THE HIGHEST MOUNTAINS.

By H. von Schlagintweit-Sakünlünski.

I DESIRE to make some particular observations on the three highest mountains of the globe, because not unfrequently, even in the latest works intended for general teaching, we find other eminences (Dhavalagiri for instance, or at any rate Kánchinjínga) named as the highest.

The three highest points then on the earth's surface, so far as we know at present, are the following:—

1. Gaurisánkar, or Mount Everest, in the Himalaya range, on the borders of Nepál and Eastern Tibet. 27° 59′ 3″ N., and 86° 54′ 7″ E. from Greenwich. 29,002 Eng. feet.

2. Dápsang, in the Karakorúm range, in the Province of Núbra, Western Tibet. 35° 58′ N., 77° 10′ E. from Greenwich. 28,278 Eng. feet.

3. Kánchinjínga, in the Himalaya range, on the borders of Sikkim and Eastern Tibet. 27° 42′ N., 88° 8′ 4″ E. from Greenwich. 28,156 Eng. feet.

This last mountain has been known since 1850. Gaurisánkar was first made known to the world (under the name of Mount Everest) by the Indian Trigonometrical Survey, December 18, 1855. I had however already seen it, when in Sikkim, in the summer of that year, as part of the panorama of the Singhalíla chain. It forms the subject of the first plate in our atlas. The name "Gaurisánkar," I heard first in Nepál, in the year 1857, from the Hindu Pándits, who communicated it to me, and explained its meaning.

Dápsang, which, in point of height, comes between the other two, is in a totally different range of mountains; being in fact situated as far from the loftiest group of the Eastern Himalayas, as Mount Parnassus in Greece is from Cape Finisterre in Spain. Our route to the north of Tibet in 1856, led us right across this giant range, which itself stands on a platform 17,500 (English) feet high. A picture of it may be seen in the profile panorama, No. 15, of the atlas.

With regard to the signification of the names, it is worth while saying a few words, as they are singularly well chosen for mountains of such exceptional height.

Gaurisánkar is a Sanskrit word, which however retains a place in the existing Hindu mythology "Gauri," a title given to the wife of the god Shiva, means, "the sublime, the radiant one;" while "Sankar" is one of the names by which Shiva himself is known.

The two other names belong to the Tibetan language, and are drawn from local peculiarities. Dápsang signifies "the bright heavenly appearance," in allusion to the brilliant aspect of the snow-covered mountain and the plateau on which it stands. In this tract, in spite of its remarkable elevation, there are very few large glaciers. Even the natives, as they sometimes traverse this desolate range with their caravan trains, are surprised at not finding more: their rarity, however, is in fact due to the extreme dryness of the atmosphere. The mean limit of perpetual snow in the Karakorúm range stands at 19,400 feet on the southern, and at 18,600 feet on the northern slope.

The name of Kanchinjínga is also Tibetan, and signifies "the five ice-crystal jewels," whereby are intended the five great glaciers which spread out at the foot of this mountain. Recent researches have established the fact, that the Karakorúm range, almost parallel as it is with the Himalayas, must be held to be the principal watershed; and that from it, and not from Kuenlúen, as has been hitherto erroneously supposed, the rivers take their northerly direction. We first recognized it as such when we succeeded in crossing it, and in proceeding even to the north of the Kuenlúen

chain, as I did in 1856, then accompanied by my brother Robert. In the following year my brother Adolphe also advanced into Turkistan from India, but unfortunately was killed at Kashgar in August, 1857.

The most important views of the Kuenlúen chain were those taken from the neighbourhood of a station named Sikander Mokám, for from it the eye embraces the whole range from the Yurungkásh Pass eastwards, and is at the same time enabled to penetrate the numerous depressions and indentations which mark its sides. I have given a profile drawing of one of these views on plate vii. of the outline panorama of the chief mountain ranges of Higher Asia, in my atlas.

Canadian Cotton.—The following is an extract taken from a Canadian paper:—"Public attention has lately been directed here to some specimens of Canadian cotton, gathered by Mr. Nettle, which equals silk in texture, and which can be produced in any quantity. This is indigenous to the country, and grows as a weed in the greatest abundance, and has been long used by the Canadian farmers for various domestic purposes. It is not improbable that at some future, and not very distant day, its value will be better appreciated, and that after due attention has been paid to its culture, it may enter largely into competition with the foreign product upon which we are now exclusively dependent." If this is true, our seedmen ought immediately to avail themselves of the aid of their "correspondents" to obtain seed of this plant, which seems to offer quite a new branch to the agriculture of temperate climates, as should all horticultural societies, whether national or local, for distribution to experimentalize with.—*George Newlyn.*

The common Whiting of the shops affords a ready and abundant supply of foraminifera and diatoms. Whiting is simply pounded chalk, and may be relied on as genuine for there is no cheaper substitute. As much of it as can be heaped on a fourpenny piece may be put into a tumbler of water, after being well stirred and then allowed to settle for a minute, the milky fluid must be poured away and fresh water added. This should be repeated until the water is clear enough to allow the bottom to be seen. Then stir again and the moment a little collection of sediment forms in the centre, dip it up, drop it on a glass slide and set aside. Repeat this for each slide and when dry, select the best for mounting in balsam. This for foraminifera. For diatoms dissolve in acid and treat the residuum like other infusorial earths.—*S. S.*

A parasitic Rotifer.—Mr. Ray Lankester has found a curious parasitic Rotifer in the body-cavity of two species of Synapta in the Channel Islands. A figure of this parasite is given in the last part of the Microscopical Journal.

ZOOLOGY.

Otters.—When a gamekeeper was ferreting for rabbits a few days ago, in the neighbourhood of Oxton, Cheshire, two otters suddenly rushed out of the hole into which the ferret had just entered. The keeper, having a double-barreled gun with him, shot them both on the spot. One was a fine full-grown female and the other a young male, both being in exceedingly good condition. Their hole was in close proximity to a small pond, towards which they made for their escape. They have been sent to be stuffed in Birkenhead where they were exhibited to the public for a few days, and are now in the possession of J. Smyth, Esq., Oxton, who would, I have no doubt, shew them to any incredulous zoologist who might wish to see them. They are considered a great rarity in this part of the country.—*W. F. Price.*

Bittern in Aberdeen.—A fine specimen of the Bittern (*Ardea stellaris, Linn.*), was shot in the parish of Auchterless, on the 20th Dec., 1867. The stomach contained fragments of the Water Beetle (*Dytiscus marginalis*). It is now a very rare bird in this county.—*G. Sim, Aberdeen.*

Elephant Hawk Moth.—One morning during the last summer I found at West Drayton a specimen of this beautiful insect on the inside of a window that had been left open all night.—*T. B.*

Chameleons.—In a former number of the Science-Gossip, one of your correspondents expresssed a wish to know of any treatment of Chameleons which had been successful. A few weeks ago I saw an intelligent letter from a lady who had kept two Chameleons all through the severities of an English winter, for the space of six months, from which I am allowed to quote some very interesting information as to their mode of living, sleeping, eating, &c. These Chameleons were specimens, and came from Alexandria. They were kept in a glass stand placed in a sunny window; a silk braid was attached to their hind leg, which was again attached to a plant in the stand, so as to permit them to climb wherever they wished. This pleased them very much, and they were always well and moving about, which is their great delight. Their night arrangements were very complicated. They were put to bed every night in a small tea-chest, in which was placed a hot-water tin covered with thick flannel, and the animals were again covered up warmly with flannels. The lid of the box was perforated with small holes. The Chameleons were fastened down, as they have a habit of making themselves quite flat and thin, so as easily to slip away. Their favourite food is flies or worms. Meal-worms were procured for them, as that is the food used in the Zoological Gardens.

One was destroyed by getting its string entangled in crossing the hearth, and the other died from sympathy, as it was supposed. They never draw water from a vessel, so the plants in their stand were plentifully sprinkled daily with water. The contrary motion of their eyes has been frequently observed. Their tongues are five or six inches long and forked at the end.—*Maggie Lawrence.*

Nais and Syllis.—I cannot accept as true philosophy the teaching of the Rev. W. W. Spicer in your January number, to the effect that there exist animals who need not to die. In ancient times a naturalist said, "there is one event common unto all," and during the twenty-eight centuries that have since elapsed, the closest searching has failed to discover a single instance in the history of plants or of animals where death, that one event common to all, has failed. The *Nais* and *Syllis* referred to by Mr. Spicer, have the faculty and do propagate by the process of self-division. This appears to be a process closely allied to budding, and has been styled by able physiologists internal budding. The part of the body from which the new animal arises, is endowed with a power similar to that inherent in buds, by virtue of which a second body is produced, which is more or less similar to that of the parent. The *Syllis* is a good instance of "alternate generation;" from a true ovarian germ there results only a sexless worm or neuter; by fission this gives rise to one that is perfect. I am not willing to suppose, with Mr. Spicer, that this self-division may go on for ever, "that is to say, throughout all generations;" on the contrary, there is every reason for believing a limit is set to this fissiparity in the multifid individual. The spread of the species is provided for by division, but its permanence is only ensured by the normal method of reproduction by germs. The life history of these humble animals has not been completely studied, but if we go to those plants which have long been raised from slips or buds, we will get a full account of the final result of this method of propagation. Without doubt, the power of reproducing by means of a bud or a branch, does prolong the life of an individual—but not indefinitely. We know that a vegetable variety can only be maintained and propagated by slips or buds from other plants, which were derived in the same way from the original stock, and it is well known that in course of time these varieties wear out; they cease to be productive and have to give place to others more recently raised from the seed. Hailing from Ireland, I will be privileged to refer to facts that are well known here regarding the potato. Before the breaking out of the potato disease, the favourite root in the north of Ireland was the "black seedling;" this, owing to its fine flavour, had been in favour for some twenty years. But very shortly before the outburst of the disease, it appeared to be failing both in quality and in produce, and a young and vigorous rival known as the "cup" potato was supplanting the old favourite. Now the "black seedling" has totally disappeared, and I don't believe that the offer of a sovereign would secure a single tuber. The individual from which it sprang is defunct. The "cup" potato has gone the same way, so that the "red rose," the "apple" potato, the "lumper," and several others which are replaced by a new set, the "white rocks," "skerries," &c. If, then, we regard varieties of the potato as individuals, we shall find that these varieties die out. The individual perishes, no matter how widely his members have been disseminated. The same rule holds with regard to fruits. Pomologists understand it and endeavour to get from the seed good varieties to supersede those that are becoming effete; and was the fate of the generations of *Nais* and *Syllis*, sufficiently known, doubtless they would be found to be no exceptions to the common law. Being creatures of a higher organization than the plants referred to, "somatic" death would be seen to overtake them in a much shorter time than it does the vegetable.—*S. A. Stewart, Belfast.*

Flycatcher's Nest.—During a recent visit to Warwickshire, I observed the nest of some small bird in a very singular position, and on inquiry was informed that it had been built by a pair of "fly-catchers," who, not being themselves of nervous temperaments, and apparently regardless of those of their offspring, had there fixed their nursery. The nest is placed upon a wooden peg projecting about three inches from the external wall of the vicarage of Burton Dassett, at a height of 8 or 9 feet from the ground; in the end of the peg is fixed the spiral spring carriage of a bell used for summoning the residents of the vicarage from the garden; the upper curve of the spring rises a few inches above the peg, and the bell itself hangs just below, the whole being protected from the weather by a small gablet roof. The nest is placed between the upper part of the spring and the wall, and is moved slightly by every vibration of the former. It seems singular that the sudden jerk imparted to the nest, accompanied by the clang of the bell whenever it was used, did not effectually deter the birds from building there, but these disturbing influences really had so little effect as not even to cause the sitting bird to quit the nest, and so far as is known, the young family was reared and launched on the world without mishap.—*E. S.*

Extinct British Pelican.—At the meeting of the Zoological Society of London, held January 9th, 1868, Professor Newton exhibited the humerus of a large species of extinct pelican from the Cambridgeshire Fens.

The Oak Egger Moth.—It appears to be well-known that as soon as a female moth—of some species—bursts the chrysalis, the males will arrive from all directions; but, according to a book I lately read, the attractive influence is unappreciable to human sense. If the last statement is generally believed, I think I can help to elucidate the subject. In June I caught a large and (to me) strange larva, in due time it spun a very tough cocoon, and from it, in September, emerged the imago which proved to be a female Oak Egger Moth (*Lasiocampa quercus*). The succeeding day I placed it at the end of the room where I was sitting—the door being open; during the subsequent two or three hours I had five males enter the room; I especially observed one flutter some distance past the door, when it was evident he discovered a mistake, for he quickly retraced his flight to the door, when after a little ceremony he boldly entered. Those who have seen a hare hotly pursued by the hounds suddenly turn through a hedge at a right angle to her previous headlong career, and then saw the hounds overrun the scent and trace back, witnessed an error corrected similar to the moth's in his excursion. Again, I had nasal evidence of a powerfully odorous emanation from the insect. My olfactory nerves left me no room to doubt what that potent, yet secret, influence was which directed to an unseen object.—*John Onions.*

Frogs.—Some one, in a previous number of Science-Gossip, speaks of frogs climbing up glass. As to whether a frog can climb a window pane or not, I cannot say, but I can assure you that I and my son went out to collect frogs, &c., and we put a number of little frogs into a wide mouthed bottle, up which they climbed, and would have made their escape had they not been prevented.—*G. Bullard.*

Spiders.—Some few years ago, where I was living, there was an out-house adjoining a plantation, and in the autumn a number of spiders used to congregate on the inside of the outhouse, and a number of flies; but instead of the spiders killing the flies, the flies killed the spiders. They used to get under the belly of the spiders and suck all the goodness out of them; they were long-legged spiders with bodies about as big as half a pea; the flies were little stout-made brown ones.—*G. Bullard.*

Rare Birds in Kent.—On Tuesday the 19th November, 1867, a fine specimen of the Golden Eagle was shot at Lydd, Kent; it was first seen by the groom of the Rev. B. Cobb, and afterwards shot by the son of Mr. John Wood, farmer; it is now in the possession of Mr. G. Jell, ornithologist, to be preserved. The bird is in excellent plumage, stands about two feet high, and measures nearly three feet in length. This is the first Eagle shot in this locality in the memory of man. There has also been shot lately in this neighbourhood three specimens of the Hoopoe (*Upupa Epops*), a fine specimen of the Arctic Skua Gull (*Lestris Richardsonii*), and a Quail (*Tetrao Coturnix*), all of which have been preserved by Mr. Jell.—*James Ward, Ely Court, Staplehurst, Kent.*

The Birds of Berks and Bucks.—Mr. Alexander Clark-Kennedy is about to issue, under the above title, "A Description of the Local Distribution of all the British Birds that have ever (as far as the author knows) occurred in Berkshire or Buckinghamshire." Notes on the occurrence of rare visitors, original anecdotes of birds, or the dates of the arrival and departure of emigrants, will be thankfully received by him. The work will be illustrated by coloured photographs; its price to subscribers being 6*s*. All communications should be addressed to Alexander Clark-Kennedy, Esq., Messrs. Ingram & Halton, Booksellers, Eton, by whom also subscribers' names will be received.—*B.*

Woodcock (*Scolopax rusticola*).—A friend of mine found a nest of this bird some two years since on the estate of Mrs. Honeywood, of Marks Hall, which, although frequently visited by the curious, hatched its eggs and brought off its young in safety.—*C. Denny, Kelvedon.*

Wooden Taps and Acari.—If wooden taps are used for beer or wine and a portion of the liquor be poured into a glass, which is held so that the light may fall obliquely upon the surface, and the observer, instead of looking directly downwards, places his eye at an opposite angle to the light, living mites will be found floating on the surface: these are sugar mites (*Acarus sacchari*). If a hand magnifier is used, or some of the acari be placed under the microscope, their character will be very evident. No doubt it is conducive to the success of the experiment if no liquor has been drawn for a few days previous to the trial; for the mites exist about the external part of the tap, and are washed into the glass when the liquor is first drawn off. These Acari are able to survive during very severe weather; for on the 8th of the present month (December) I drew off about a tablespoonful of ginger-wine into a very small wine-glass, and found forty or more of them alive upon the surface. As far as my observation extends, it is not necessary that the wine or beer should contain cane sugar in order to produce these mites; all kinds of wine seem subject to produce them, provided the taps be of wood. To obviate the swallowing of these disgusting insects, it is worth while to try taps made of Wedgewood's ware; but they are somewhat expensive and require care. A cheaper material has lately been used in making an earthenware tap, which, it is hoped, may prove to answer the purpose.—*S. C. Sayer, Swinton, Manchester.*

Baby Prawns.—Truth compels me to say that my friend Mr. J. K. Lord was mistaken when he wrote in *Once a Week*—"I am disposed to think that the baby prawn, when it quits the egg is the exact counterpart of its parent in everything except size." I should have thought it unnecessary to notice the inaccuracy if it had not been most unaccountably confirmed by "G. S." in Science-Gossip of last month. I have more than once obtained a brood of young prawns (*Palæmon serratus*) by keeping in a vessel of sea-water a "berried" female ready to spawn. There is, it is true, a certain general resemblance between the parent prawn and its young. The difference is not so marked as that between the zoe and the mature condition of the crab; but still it is sufficiently distinct and important to immediately attract attention. I have before me a slide containing a number of these little creatures mounted for the microscope last season, about twenty-four hours after they were hatched. They present as nearly as possible the appearance of another species of prawn figured in its larval state by Mr. Bell in the Introduction to his British Crustacea (page lix.), and exactly corresponds with his description of them. The true feet are rudimentary; the eyes wholly sessile, and not elevated on foot-stalks; the rostrum is undeveloped; there is no appearance of abdominal members; and the tail is of a simple spatulate form, "remarkably different," as Mr. Bell correctly states, "from the highly developed and complicated structure of that organ in the adult."

In the young lobster, also, the tail is of this spatulate form, and is not separated into leaflets until it has undergone one or more metamorphoses.

If "G. S." will communicate with me by letter at the office of *Land and Water*, 80, Fleet Street, I shall be happy to make an appointment with him, and to show him the specimens of young prawns and lobsters I have referred to; and I shall be glad to examine those which have enabled him, in contradiction to experienced naturalists, to *state as a positive fact*, that which Mr. Lord was only *disposed to think*—namely, that "the baby prawns undergo no changes, but are the exact counterpart of their mother in everything except size."—*Henry Lee.*

Chameleons.—I noticed in your useful publication for November last (No. 35) an averment founded on Clermont's "Reptiles of Europe," that the Chameleon is not found at the Cape of Good Hope. This is an error; it is one of our most common reptiles, and numerous over the colony. I am not acquainted with more than one species; but its variety of colour and marking is prodigious. Black and brown, grey, yellow and buff, and apple-green with dark purple stripes or spots, are the more common varieties.—*C. A. F., Capetown.*

BOTANY.

A New Carduus.—Mr. Jenner laid on the table, at a recent meeting of the Botanical Society of Edinburgh, twelve sheets of specimens of a *Carduus*, new to Britain certainly, and probably new to Europe, if not new to science. The descriptive characters of the plant, which it is proposed to call *Carduus carolorum* (it was discovered by Mr. Charles Howie and Mr. Charles Jenner), will show botanists its distinctive peculiarities. It does not vary much from a plant described by Linnæus in his "Species Plantarum" edition, 1753, under the name of *Carduus helenioides*, found in Siberia, but it is distinguished from it by some marked specific differences. It was gathered on the borders of Ross-shire, within a very circumscribed area, growing on a high bank above a rocky streamlet. Grim old indigenous trees of the *Pinus sylvestris* were thinly scattered up and down, and mountains of considerable elevation shadowed the place. This *Carduus* may perhaps be a hybrid between *C. palustris* and *C. heterophyllus*; but the point of interest is, that it appears to be in every respect a true species, maintaining its place in nature by the power it has of reproducing itself and of conserving its own special characteristics.—*Gardener's Chronicle.*

Flora of Bucks.—The list of Buckinghamshire plants, referred to at p. 277 of Science-Gossip for 1867, is now published, and I shall be glad to send a copy to any one who may desire it. The total number of plants enumerated is 777 species and 22 varieties. Of these, 719, and 19, respectively, may be considered as native, or naturalized: 52, and 2, as introduced, and not naturalized; while 5 species and 1 variety may be considered as doubtful, or erroneously recorded. Since the publication of the list, I have been enabled to add *Filago gallica* to it. There is a specimen in the herbarium of the British Museum from Iver, gathered by Mr. Lightfoot. This, with the recent discovery of the plant in Surrey (see p. 278, vol. iii.), raises its cornital area to 5. Mr. J. C. Melvill informs me that he collected *Potamogeton pusillus* and *P. perfoliatus* near Great Marlow in 1864. These are also additions to my list. The number of Bucks species is thus raised to 780.— *James Britten, High Wycombe.*

Dragon-tree of Teneriffe.—The famous Dragon-tree of Orotava has been blown down by a furious gale and wholly destroyed, after having flourished, it is said, for sixty centuries. A storm in 1819 deprived this tree of part of its crown, but *now* all that remained has become a wreck. Its circumference was about 48 feet, whilst the total height did not exceed 75 feet.

Agave in Bloom.—A Mexican agave (*Agave dasylirioides*) is now in bloom at the Botanic Gardens, Regent's Park. It is growing in a tub which it more than half conceals with its long, pendulous, strap-like, spineless foliage, from among which issues the flower-spike, 10 feet 4 inches in length, something in the form of a gigantic whip, the thong of which measures some 18 inches in circumference, and is densely packed with green flowers, from which the stamens conspicuously protrude.—*Gardener's Chronicle.*

The Gunpowder Plant.—I wonder if there is any truth in the story related in books on New Zealand of the origin of the abundance of the common dock there? It is said that an artful "Jack ashore," coveting the fowls and pigs of a certain chief, sold him a sack of dock seed which he had imported as a speculation on the credulity of the New Zealanders. It was purchased under the belief that when sown it would produce an abundant crop of the best Dartford gunpowder. The rage of the chief when he found out the cheat knew no bounds. Another edition of the story, with perhaps more probability of truth, was that the dock seed was introduced as that of tobacco, the favourite weed of the Maori; others say that the dock was introduced with clover. The New Zealanders were very anxious to procure European seeds; a young chief worked his passage to England for this purpose, as is related by Hamilton Smith.—*C. O. G. Napier.*

Ferns of Buckinghamshire.—An interesting paper on the Ferns of Buckinghamshire was read by Mr. Ullyett at the meeting of the High Wycombe Natural History Society, on the 10th December, and is published in the *Quarterly Magazine* for January, with a localized list by Mr. James Britten.

Nasturtium Siifolium.—In No. 37 of Science-Gossip, the question is raised as to *Nasturtium siifolium, Rchb.*, being a true variety of *N. officinalis, Linn.* There is certainly a marked difference when compared with luxuriant specimens of the latter. The lower part of the stem is more creeping, fibrous, and fistulose, extending more than a foot from its extremity upwards, before it emerges from the soil, when it becomes erect, and reaches a height of about three feet. The leaflets are more numerous, distant, and pointed, resembling rather those of *Sium latifolium.* It appears to be a permanent variety, and in this neighbourhood grows in shallow stagnant as well as running water. I take this opportunity of mentioning the frequent occurrence of *Œnanthe pimpinelloides, Linn.*, in Dorsetshire; it is a very common Umbellifer, and is not confined to any peculiarity of soil or district, except, perhaps, the uncultivated portions of our tertiaries. The climate of the county appears exactly suited for it, as it grows equally luxuriantly on the arid heights of Portland, as in the lowlands of the Vale of Blackmore; the rarest form of this genus, is doubtless *Œnanthe silaifolia, Brst.*, which grows only in the dampest meadows. *Œnanthe lachenalii, Gmel*, is more frequently met with, but as it is a salt marsh plant, its habitat is restricted to the neighbourhood of our numerous estuaries.—*J. C. Mansel, Longthorn, Blandford.*

Ivy Again.—About ten or twelve years ago, the late Professor Henslow was making a collection of British birds' nests, and in order to secure one which a wren had built between two parallel stems of ivy, covering very luxuriantly an old hawthorne, he had the stems sawn completely asunder, and pieces about eight or ten inches in length, with the nest between them, carefully removed. On writing to the present incumbent of Hitcham, Suffolk (Rev. A. R. Grant), he informs me that the ivy has continued as vigorous as ever, notwithstanding having no communication with the ground. The stems, if I remember right, were about 1½ inches thick. A question one feels inclined to ask is, whether ivy-roots absorb moisture from the air like epiphlytical orchids.—*George Henslow.*

Pink Primroses.—Your correspondent, R. Holland, seems to think that they are vagaries, and not varieties. In Pembrokeshire and Cardiganshire, they are in many parts the rule, and the yellow the exception. I have seen hundreds of plants continguous to each other, and therefore draw the conclusion that the pink primrose is a distinct variety of the yellow, they being in masses instead of few and far between. —*D., Tredegarville.*

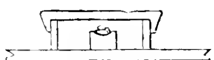
Yellow Violets.—Among the varieties of yellow violets, *Viola biflora, Linn.*, is perhaps the most attractive, but as your correspondent, Mr. E. J. Law (in the January number), does not give the specific name of the one he found near Courmayeur and elsewhere in the Alpine range, it is uncertain whether or not he refers to this. *Viola biflora* is not a rare plant in what may be botanically termed the sub-Alpine region of the Pyrenees; it grows at the foot of the Port de Vevargar, Esquierry, Medassales, Cirque de Gavarnie, and Port de Picardi, places well known to the Pyrenean tourist.—*J. C. Mansel, Longthorn, Blandford.*

Variation in the Parsley Plant.—In September last, a small root of Parsley (*Petroselinum sativum*) was gathered in my garden here. I enclose a sprig, from which it will be seen that the end of each small stalk instead of producing the usual leaves, is prolonged into a leaflet, somewhat resembling a blade of grass. Is not this very unusual with parsley? The whole plant was about eleven inches in height.—*R. E., Galway.*

MICROSCOPY.

Opaque Objects.—An examination of several hundred slides of opaque objects, mounted in closed cells, has induced me to attempt a remedy for the sad state in which I find them. Consisting of every kind of object; mostly obtained from the best known preparers; they are all greatly deteriorated, and too many, alas! totally spoiled by the growth or incrustation formed on the under side of the glass cover. In order to avoid any further loss or inconvenience from this cause, I have proposed what may be called a "pill-box cell," turned in wood, and have added to it a small cylinder, also turned in wood, to act as a stop for the half-inch objective. The cell and stop can be reduced in depth, as required by glass paper, and after being cemented to the slide, should be coloured with lamp black in

a



b

Fig. 37. Pill-box cells.

water. Fig. *a.* is the cell arranged for any power up to one inch, for which it forms a stop when the Lieberkühn is used. Fig. *b.* shows the arrangement for the half-inch objective with Lieberkühn, the thin bottom of the cell having been removed. This mode of putting up opaque objects, not only shews them, as they ought to be, uncovered, but allows any part of a freshly killed insect, or analogous object, to be mounted at once as a permanent slide, without danger from evaporation. The cells and stops can be procured at Baker's, in High Holborn. —*H. C. R., Kensington.*

New Infusoria.—In the Quarterly Journal of Microscopical Science for January Mr. T. G. Tatem describes three species of *Epistylis* and one of *Cœnomorpha* as entirely new. One of the species of *Epistylis* was found in salt-water, whereas the genus was before believed to be confined exclusively to fresh-water.

Quekett Microscopical Journal.—The new Journal of the Quekett Microscopical Club has made its appearance, and contains a paper on "Universal Microscopical admeasurement," one on Pseudo-scorpions, by Mr. S. J. McIntire, a short communication by Mr. Bockett on Ross's 4-inch-object glass, "Recollections of our Meetings," the "Proceedings," and the first instalment of a "Microscopical Bibliography."

Wheeler Insect.—The Wheeler insect is a curious microscopical object. Take a little dust of rotten timber and a drop of water; by-and-bye the insect appears, two horns arise on its head, then a wheel, the velocity of which is surprising, it sails among the dust as if amidst islands. The wheel seems intended by suction to draw in numbers of smaller insects, its food.—"*The Times*" (*Friday*) *July 2nd*, 1824.

Plumules of Butterflies.—Mr. J. Watson has recently read his third paper before the Literary and Philosophical Society of Manchester on the Plumules of Lepidoptera. He is of opinion that they are so constant in their character, and so distinct in different species that they are of value in determining species and varieties. A full and complete work on this subject is promised, copiously illustrated, the advent of which microscopists will hail with pleasure.

A STORY OF SCIENCE.

BY ONE WHO KNOWS NOTHING ABOUT IT.

A philosopher sat in his easy chair,
Looking as grave as Milton;
He wore a solemn and mystic air
As he Canada balsam spilt on
A strip of glass, as a slide to prepare
For a mite taken out of his Stilton.

He took his microscope out of his case,
And settled the focus rightly:
The light thrown back from the mirror's face
Came glimmering upward brightly.
He put the slide with the mite in place,
And fixed on the cover tightly.

He turned the instrument up and down,
Till getting a proper sight, he
Exclaimed—as he gazed with a puzzled frown—
"Good gracious!" and "Highty-tighty!
The sight is enough to alarm the town—
A mite is a monster mighty!"

From t'other end of the tube, the mite
Regarded our scientific,—
To its naked eye, as you'll guess, the sight
Of a man was most terrific,
But reversing the microscope, made him quite
The opposite of magnific.

"One sees the truth through this tube so tall,"
Said the mite as it squinted through it,
"Man is not so wondrously big after all,
If the mite-world only knew it!"

MORAL.

Mem.—Whether a thing is large or small
Depends on the way you view it!

Fun.

NOTES AND QUERIES.

SPIDER ATTACKS.—Having some years ago been a close observer of the habits of spiders, I am able to state that your correspondent "E. T. S." is wrong in assuming that spiders always seize their prey in the same place. They certainly more generally insert their fangs into the thorax of a fly, but by no means always. The insect is seized by the nearest part of its body, whatever that may be, and in cases where the spider is fully able to deal with its captive, the hold is shifted to the central part, usually the thorax, but often the abdomen, and sometimes the head. I have, however, seen at least one instance where the captured insect (a bluebottle), being apparently too strong for its antagonist, was retained for several minutes by the thigh, during which time the poison appeared to affect it, though gradually and not so rapidly as in ordinary cases. In this instance, being called away, I lost the opportunity of ascertaining whether the spider took another hold afterwards, but the fly was dead when I returned. Whether or no the poison be always fatal, or only has the effect of temporarily paralyzing the victim, is a matter for consideration. I have disturbed my spiders (I had quite a colony) after they have apparently killed their prey, and have then thrown another fly into the web. This being killed, I have given another, and so on till there were five or six suspended in the web, apparently dead. After the lapse of fifteen to thirty minutes, these have slowly begun to revive and before the hour was completed, most, but not all, have extricated themselves and got away. During this time the spider (*Epeira*) has remained in her cell, either gorging on a former victim or in fear of a stick with which I had poked her away once or twice. Those which recovered I think were invariably the last thrown into the web. I do not know whether the chemical constitution of this undoubted poison has been ascertained.—*Edward Sutton, Manchester.*

GARDEN VERMIN.—Your correspondent "S. E. E.," inquires how the abundance of snails and slugs in his garden is to be accounted for. When it is remembered that the small garden slug (*Limax agrestis*) lays several hundred eggs, the vitality of which neither heat nor cold appears to destroy, and that the spotted snail (*Helix aspersa*) lays more than a hundred, the wonder seems rather to be that succulent vegetables can be reared at all in the presence of such voracious and prolific animals. As for the "frost killing them," it should be remembered that most species of snails are scarcely exposed to it during hybernation. But to show what can be endured, I may mention that this winter I have found a very thinly-clad wood snail (*Helix fusca*) abroad, and comfortably feeding, after five consecutive nights of frost, while thirty or more persons were skating within bowshot of its habitat.—*C. Ashford.*

CLEANING CORALS.—In reply to Mr. Robert Holland, who inquires about the best method of cleaning corals, simply boil them in soda and water. —*T. W. G.*

AS DEAD AS A HERRING.—On the East Coast the fishermen state that herrings ask for "cheese," alluding to the squeak spoken of by "R. A.," before they give up the ghost.—*F. R. Morris.*

THE MAELSTROM.—It may interest some of your readers to know that the theory of sunken rocks and tidal influences, as the cause of this whirlpool is to be found in the "Encyclopædia Britannica." I would recommend E. A. Poe's tale (in "Tales of Mystery and Imagination,") "A descent into the Maelström," as worthy the perusal of any speculative correspondents.—*F. R. Morris.*

THE REASON WHY.—Can any one explain the reason why the Quekett Microscopical Club is not inserted in Taylor's "Calender of the Scientific Bodies of London," although the Geologist's Association is included as meeting at University College, to which place the latter body has migrated since the Q. M. C. commenced holding its meetings there. —*W.*

SAND SKIPPERS AND COMPANY.—Searching the other day at the embouchure of Ely river for small beetles, I met with an old ragged mat left by the tide, and lifting it up a cloud of Orchestidæ sprang up immediately and in a few minutes the "happy young *shrimps*" of Archdeacon Paley, which I think are the, if not akin to, *Talitrus locusta, Latr*, hopped all away, leaving on the moist ground, besides the little *Cillerum laterale, Halliday*, two patches of what I took at first for eggs of some other kind of crustaceans, but afterbetter inspection, I saw they were living Isopoda themselves, something like armadillos, but very likely a species of *Sphæroma*, or sea pill-balls. Now what kind of society have these with the Sand Skipper? Can any reader of SCIENCE-GOSSIP tell me anything about these little creatures?—*P. G. G., Cardiff.*

THE HERBARIUM INSECT.—At p. 111 of vol. i., Mr. E. Bailey, in a very interesting article, says that he has tried various means to rid his dried ferns of this troublesome pest, but without success. A friend has a valuable collection of New Zealand Ferns, which are being entirely devoured by it, and I am anxious to ascertain, without delay, the best means of arresting the progress of the work of destruction. Will the fumes of brimstone have the desired effect? I anxiously await an answer.—*B.*

EFFECTS OF COLD.—In the early part of October the weather was so unseasonably cold, that the *Swallows* (all are swallows here), were taken by the hand. I saw none but this year's birds taken thus. In the suburbs of London they flew so low as to be struck by the whips of the drivers of vehicles.—*G. Bullard.*

TEMPERATURE.—In January's GOSSIP Mr. White states that the glass stood at 51° on the first ult., and at 26° on the second. My glass stood at 52° and 30°. If Mr. White will refer to Dec. 19, 1866, he will find there was a much greater difference. My glass stood at 72° on the 19th, and at 34° on the 20th, showing a fall of 38°; this latter one was in the sun. I find in my weather table for 1864, Nov. 3, it was 83° in the sun and the following day it was 38½°, showing a fall of 44½°. Unless a person is in the habit of registering the changes of the thermometer they cannot form the slightest idea of the trying nature of our climate. Thus in June, 1866, the glass stood at 55°, in Dec. same year it stood at 72°. I make no doubt that were I to search my tables for a few years back, I should find still greater changes. No wonder we English are so subject to diseases of the respiratory organs.—*G. Bullard.*

Adhemar's Theory.—Would you state whether there is any exposition in English of Adhemar's theory of the periodic deluges as being caused by the precession of the equinoxes, and if the theory has obtained favour at all in England? Its bearing on the antiquity of man, and on the unity, seems to me to be very direct.—*L. T.*

Bugs.—None of the correspondents of S. G. who have written about Bed-bugs seem to be aware that olive oil will destroy bugs. A small drop of the oil taken up on the head of a pin and placed to the mouth of a bug will cause it to raise its body, head upwards, by straightening the legs and posterior part of its body, and instantly die. A little oil placed in the mortises and on the tenons of a bed-stead, or on other places infested by bugs, will effectually banish them from the parts so treated. A bug placed upon a table, and a small circle of oil traced round it, cannot escape from the circle.—*T. Rogers, Q.M.* 81*st Regt.*

New Zealand Laurel (see pp. 21).—The plant referred to by your correspondent is no doubt the Karaka, *Corynocarpus lævigata, Linn.*, N. O. *Anacardiaceæ;* not therefore the true "*Laurel*" or one properly so called popularly. Reference is made to the edible and poisonous character of the berries under different circumstances in a paper by Dr. Lindsay, of Perth, on "The Fruit Plant and Poison of New Zealand," in the "British and Foreign Medico-Chirurgical Review," for 1865, p. 177.

Difficulties of Botany.—I have recently began the study of Edible Fungi, and have proceeded very well at present; but can you tell me what the meaning is of the name in *italics* after the latin name of each species?—for instance, we read *Agaricus nebularis*, "*Batsch.*" Very well; I tried a batch, and very good they were; but what puzzles me is the meaning of "Curr," "Sow," "Bull," "Tode," and "Hogg"! What have these animals to do with edible fungi? I can understand "*Vitt;*" of course that means they are good for *victuals*, and "Cooke," that clearly means *cook'em*, and "Fries," too (they make very good fries); but why we are told to "Bolt" certain pieces I cannot tell, neither is it clear to me why "Kneiff" is sometimes recommended, with no mention of a *fork*. Perhaps some of your correspondents will enlighten me on these points in an early number of Science-Gossip.—*S. O. Green.*

Phthysis amongst Swallows.—The *post-mortem* appearances of the Swallow picked up by Mr. Lawson Tait, and described by him in Science-Gossip of January the 1st, exhibit a remarkable similarity to those presented by Grouse stricken by the so-called "Grouse-disease." During the months of August, September, and October dozens of these birds were received at the office of "Land and Water" from correspondents who sent them for examination and dissection, and in nearly every case we found the symptoms described by Mr. Tait. There were the same indurated patches in the peritoneum, and the same tuberculated condition of the pleural surface of the lungs. In many instances other organs also were seriously affected; the liver especially was frequently in a horribly diseased state, and the pericardium hard and friable. In these cases tracheal worms were generally found.—*Hennybel.*

Live Trap for Slugs.—Lady Dorothy Nevill employs Plovers to consume the slugs, &c., in the gardens; and these birds, as well as being beneficial to the garden, add much ornament to it, by their beautiful plumage. As to the objectionable thing quoted by your correspondent, pertaining to the peculiar habits of "gulls and ducks," I feel justified in adding that the plover is perfectly harmless among beds of flowers, fruits, or vegetables. I would like to urge that we should always endeavour to be humane; therefore, those who confine these birds within unnatural limits must remember that they require a few luxuries in severe weather when their usual food is not obtainable. They are not, however, fond of anything—we only know of bread as a substitute.—*George Newlyn.*

Bee Query.—I am in the habit of watching closely the habits of Bees, and am much surprised to find one of my hives empty. Can any of your readers enlighten me on the subject? When first I noticed them missing, was after the last severe frost.—*E. J. W.*

Fever Plant.—Dr. Livingstone in his "narrative" writes of a caution given by the natives against a plant which excites fever, and he adds: "Dr. Kirk discovered it to be the *Pæderia fœtida*, which, when smelt, actually does give headache and fever. It has a nasty fetor, as its name indicates." This plant is also plentiful in some parts of India. Is there any intimation of similar effects having been observed in Assam or Bengal?—*C. M.*

The Viper Question.—On reading Mr. Brigham's remarks in Science-Gossip relative to my contribution respecting the viper's poison having proved fatal to a woman in Dorsetshire, I made immediate enquiries, and was told I had mistaken the scene of the tragedy. Two persons informed me that a woman had been bitten by a viper near Maiden Castle, and was reported to have died from the effects of the bite; but they would not vouch for the truth of it, neither will I; and I beg to express my regret to your readers that I was led to state as a fact, on the authority of another, what certainly must be considered as not proven. It is far from my desire to be a sensational paragraph writer in Science-Gossip or any other publication, but I am still of opinion that the viper's poison has in some instances proved fatal to human subjects, and I think I shall be able to cite cases shortly. A medical gentleman residing in Wales, James Rogers, Esq., the author of a very clever "Sketch on the Cholera Epidemic of '66 at Ystalyfera," writes to me as follows:—"I can easily believe that a similar injury in a highly irritable subject might be followed by so much constitutional disturbance as would lead to a fatal termination." The "similar injury" alluded to was a case of viper bite which he successfully attended in the Gwendralth Valley at the time he was resident surgeon at my husband's (Mr. Alfred Watney's) Iron Works. A case of viper bite, which nearly proved fatal to the girl bitten, occurred in this village a few months ago; but in this instance also the patient recovered from the bite—

The viper 'twas that died.

All my medical friends consider the viper's bite to be poisonous, and confirm what Mr. Rogers says respecting the possibility of such poison proving fatal.—*Helen E. Watney.*

ZOOLOGICAL GARDENS, REGENT'S PARK.—When we stroll through these gardens and admire the beautiful creatures which have been collected from the various parts of the world, we perhaps little think of the large outlay which has been necessary to procure them. A little glimpse of the value of the whole collection may, however, be gathered from a very curious advertisement of duplicates. There are pheasants at £30 to £40 each. Fourteen of the rare ones come to £680. Geese at £6 each; pigeons at £2 each; elands at £150 the pair; and deers ranging from £5 to £30 each. None of the great Carnivora seem to be in duplicate, or we might be able to know something of the current prices of lions, tigers, and grisly bears.

SPIDER DOINGS.—Father Babaz is rather behind in his discovery about spiders projecting a thread to a distance. A Mr. Murray in 1828 mentioned the same thing in "Loudon's Magazine," and there was a long discussion as to how they were able to do this; whether heat, draught of air, or electricity assisted, as the animals seem far too small to project a thread to the distance they sometimes do by their own powers alone.—*E. T. S.*

SPIDERS' FANGS.—You, Mr. Editor, are rather hard upon me, but I have no wish to prolong any controversy upon the subject; though perhaps you will allow me a small space to thank H. Davis and J. T. Young for their obliging offer. The poison-bag I did not find before, as I understood that it was situated at the base of the fang. The size of the bag is considerable, as in one case I found the length of the bag and sac fully a ¼-inch long.—*E. T. S.*

ABUNDANCE OF SNAILS.—In 1854-55, I noticed that snails were especially abundant, much more so than in the three drier seasons which succeeded. This was particularly the case with the wood-snail (*Helix nemoralis*) and the garden snail (*Helix aspersa*). During 1854 I collected some hundreds of specimens of the former, and was at first inclined to accept them as three species, namely, as *hortensis* and *hybrida*, in accordance with Furton's manual, but at last I found varieties intermediate and passing by almost infinitesimal gradations between each of the supposed species; yet there certain are rules which I never saw deviated from. A yellow snail with black bands might have a brown, a pink, or a white lip; but I never found the cinder-violet variety with any but a brown lip. Have any of the readers of SCIENCE-GOSSIP observed the effect of crossing opposite varieties? I think experiments here might afford valuable evidence for the followers of Mr. Darwin and others. Monstrosities of *nemoralis*, notwithstanding its abundance, are rare. I once found a *Var. scalaris*, of the corkscrew form. That of the *aspersa* is reckoned so rare that a dealer offered a considerable sum for one in the cabinet of my friend, Mr. H. R. Jordan, F.G.S.—*C. O. G. Napier, F.G.S.*

THE VETERAN RENNIE.—The author of the well known popular works on Insect architecture, Insect miscellanies, &c., Professor Rennie, recently died at Sydney, in New South Wales, at the advanced age of 81.

MADROÑO.—(S. G. Dec. 1867, p. 280.) The author is right in calling "Arbutus unedo" the Madroño of the Spaniards.—*B. Melle.*

BRASILIAN PLANTS.—Many Brasilian plants have the words *rana* or *assú* in their names. I should feel obliged if some kind reader would tell me the meaning of them.—*B. Melle.*

ZIRICOTE.—I asked last year (S. G. 1866, p. 47.) the botanical name of Ziricote or Thericote wood. Since that time, I received from Mexico some of the flowers of which I forward two to the Editor of S. G. They belong to the laurel order, but I cannot ascertain the species; it may interest other readers as well as myself, to know the names of them.—*B. Melle.*

[The materials forwarded are insufficient for determination. The calyx was not sent, nor was it stated whether the leaves are alternate or opposite. The corolla, Professor Oliver says, would do for *Cordia* of the section *Sebestenoides* (D. C. Prodr. x., p. 476), but no known species has such a leaf. Do leaf and flower really belong to one another? We strongly suspect that they do not. Is this Ziricote identical with the Anacahuite wood of Mexico? See "Pharmaceutical Journal," vol. iv., n. s. pp. 271, 1863; also Dr. Seemann in the "Technologist," vol. ii., pp. 24. It is true that there appears to be no great similarity in the names, but Anacahuite wood, said to be a specific for consumption, is believed to be the produce of *Cordia Boissieri* (D. C. Prod. ix., p. 478).—ED.]

HANGING PLANTS.—I observe several hanging plants, viz., Linaria cymbalaria, Saxifraga sarmentosa, &c., have the under part of their leaves purple. Has this remark yet been made and any reason given for it?—*B. Melle.*

GALL INSECTS.—Very useful contributions to the scientific History of the Cynipidæ are being published by the Rev. T. A. Marshall in successive numbers of the "Entomologist's Monthly Magazine."

ANNALS OF NATURAL HISTORY.—This excellent journal has just entered upon its fourth series, having completed its sixtieth volume, of which the first commenced in 1838. From this period it may be regarded as a continuation of Loudon & Charlesworth's Magazine of Natural History, which commenced in 1828, so that for 40 years it has been accumulating its store of facts in Natural History, and has become indispensable to all who pursue these studies.

BEE OF CUBA.—S. G. mentioned last year (1866, p. 198 and 230.) the *Trigona læviceps*, which produces the Pwai-ngyet of Burmah, another bee of the same species, the *Trigona fulvipes*, was exhibited at Paris, with its wax and honey, in the Spanish Colonial Court, coming from Cuba. It is very small, and makes a blackish brown wax in the hollow of trees.—*B. Melle.*

TO DISLODGE BEES.—A swarm of bees having settled between the floors of a house, I wish to know how they may be removed. Will you be kind enough to give the matter room amongst the Notes and Queries in the next number of SCIENCE-GOSSIP?—*H. C.*

NOVEMBER STORMS.—Since thirty years, I observe regular storm-winds at the end of November. Has no author given the cause of them?—*B. Melle.*

NOTICES TO CORRESPONDENTS.

T. G. P.—The spots on dead leaf are those of a fungus named *Stegia ilicis*, Fr., which is very common.

F. S. is recommended to purchase a geological work of moderate pretensions, and seek therein for answers to his queries. Let him ask of himself whether it was reasonable to send us eight queries to answer, that he might be spared a little trouble himself?

W. M. J.—Your ferns appear to be all three forms of one species, *Doodia caudata*, of which No. 1 is the typical plant.—*J. G. B.*

J. G.—We cannot presume to decide from a sketch. Is it not a single fossil, such as an Echinus?

F. S.—Patience; is it not too late yet. Wait till next summer.

J. D.—It is *Urocerus gigas*, figured in Science-Gossip for 1866, fig. 167, page 181.

Bat.—We very much doubt J. D.'s bat of 15 inches in expanse being the Pipistrelle, the usual expanse of which is 8 or 9 inches. Is it not the Noctule or Great Bat?

R. S.—The Soirée of the Old Change Microscopical Society is fixed for February 17th, at the Terminus Hotel, Cannon Street.

R. O. O.—We do not remember that any diary is published, specially adapted for naturalists, and for making notes of the appearance of flowers, birds, &c.

F. R. S.—1. We know of no such Library of Natural History Books. 2. No. 3. Ask some farm labourer to help you. 4. Try chloroform.

European Lichens (T. H.)—We know of no good work on this subject. Nylander's "Synopsis" was intended to embrace all known lichens, but the first volume is all that is likely to be published. The most useful general work—historical however chiefly—is one recently published at Munich by Krempelhuber "Geschichte und litteratur der lichenologie," of which the first volume costs about 15s. It is indispensble to all students of Lichenology, and gives ample information regarding all lichenological works published up to 1865.—*L. L.*

W. R. T.—The fern is *Pteris cretica*.

Microscopic Journal.—Mr. R. Meysmor, of Devizes, wants to purchase the sixth, seventh, and eighth vols., for 1858 to 1860.

W. M. C. desires to know where he can obtain a small work by Mr. Raddon upon *S. Euphorbiæ*, which was taken at one time in abundance at Barnstaple.

C. J. W.—See "Davies on Mounting," pp. 96 to 101.

J. C. M.—The "Green matter of Priestley" consists of the lower forms of Algæ and their germs, and is by no means any one particular species. We know of no treatise on the subject you inquire for.

R. Laddiman desires to record the occurrence of *Colias edusa* at Hellesdon, two miles from Norwich, in the autumn of 1867. This cannot be regarded now as a *rare* insect, although somewhat local and uncertain.

Silex inquires for books treating of the different kinds of pebbles, agates, jasper, chalcedony, &c., that are to be found on our coast.

J. E. M.—There is one person who could name your foreign mosses accurately, but as we sent Trinidad mosses to him two years ago without yet receiving the names, we fear you would not be satisfied.

EXCHANGES.

Fossils from coal measures, or Carboniferous Limestone for a suite of Devonian fossils from Devonshire.—John Aitkin, Bacup, near Manchester.

Toome Bridge Earth (unmounted) for good dried specimens of British orchids.—R. T. Andrews, Castle Street, Hertford.

Fossils.—(200 species), Minerals (100), coins (25), recent shells (50). Birds' nests and eggs for other species. Send lists to C. O. G. Napier, 20, Chippenham Terrace, Harrow Road, W.

Sections of Tooth of Miliobates (Eagle Ray) unmounted, for other objects.—H. F. H., 49, Offord Road, Barnsbury, N.

Pieris Cratægi and L. sinapis wanted in exchange for other good British butterflies.—F. Jonas, 13, Canterbury Villas, Maida Vale.

Injections of Frog and Toad.—(various organs) mounted in glycerine, for other injections. Lists exchanged.—Thomas Stow, Wycombe, Melton Mowbray.

Achnanthes Longipes from Rio Janiero.—Send stamped envelope and quill to W. S., Rosemary Lane, Whitehaven.

Helix Revelata and Bulimus Montanus in exchange for other shells.—Alfred Taylor, Hezmalhalch Yard, York Street, Leeds.

Planorbis Glaber and Clausilia Rolphii in exchange for British land, freshwater, or marine shells.—W. Martin, 8, Wool Street, Mill Street Bank, Leeds.

Diatomaceous Earth from Duck Pond, Waterford, Maine, U.S., and French's Pond, Albany, Maine, U.S., for good mounted objects.—E. C. B., care of Editor of Science-Gossip, 192, Piccadilly.

Vallisneria Spiralis (growing plant) wanted for a consideration.—E. J. J., Diptford Rectory, Ivy Bridge, South Devon.

British Diatoms (mounted) required for good and scarce diatomaceous earths (twelve kinds) from North America. Only good slides exchanged.—Address, A. M. E., care of the Editor.

Injections Wanted for other mounted objects. Send lists to A. L., 61, Buckingham Road, N.

Glenshira Sand required for diatomaceous deposit from Salt Lake Desert, Utah.—Address, N. Y., care of the Editor.

Indian Bat Hair.—A few slides from named species offered for other good mounted objects.—Address, the Editor of Science-Gossip.

Fleas.—Wanted, the larvæ of Fleas (cat and dog), for any mounted objects.—Address, E. Wheeler, 48, Tollington Road, Holloway, N.

Santonine.—A few first-class slides for other good mounted objects.—A. N., Fareham.

Biddulphia and Isthmia. — Gatherings wanted in exchange for good mounted objects.—Z., care of the Editor.

BOOKS RECEIVED.

"On certain Scales of some Diurnal Lepidoptera," by John Watson, Esq. London, 1863.

"On the Plumules, or Battledore Scales of Lycænidæ," by John Watson, Esq. London, 1866.

"Further Remarks on the Plumules, or Battledore Scales of some of the Lepidoptera," by John Watson, Esq. London, 1867.

"The Journal of the Quekett Microscopical Club." No. 1, January, 1868. London: Hardwicke.

"Popular Science Review." No. 26, January, 1868. London: Hardwicke.

"The Naturalist's Circular." No. 20, January, 1868. London: H. Hall.

"Country Life." Nos. 19, 20. London: Bolt Court, Fleet Street.

"The Quarterly Magazine of High Wycombe Natural History Society." No. 7, January, 1868.

"The Naturalist's Note Book for 1867." London: 1, Racquet Court, Fleet Street.

"On the Transformation of Uredo rosæ into Aregma mucronatum," by E. Parfitt, M.E.S.

"Fresh Water Polyzoa," by E. Parfitt, M.E.S.

"On the Parasitism of Orobanche major," by E. Parfitt. Reprinted from the Transactions of the Devonshire Association.

"The American Naturalist," No. 10, December, 1867 Essex Institute, Salem. Trübner & Co., London.

"On the Glacio-marine Denudation of Certain Districts," by Miss Eyton, extracted from the *Geological Magazine*.

"Coleoptera Hesperidum, being an Enumeration of the Coleopterous Insects of the Cape Verde Archipelago," by T. Vernon Wollaston, M.A., F.L.S. London: Van Voorst.

Communications Received.—T. G. P.—R. S. H.—J. W.—J. B.—H.—C. S. B. G.—R. E.—W. M. J.—T. H. Jun.—J. A.—G. P.—W. C.—G. S.—B. S.—J. C. B.—B (Mede).—T. W. W.—W. A. G.—J. B.—W. E. P.—F. S.—W. R. T.—J. B.—E. T. S.—R. M.—W. W.—J. R.—S. S. A.—J. C. M.—L. L.—J. G.—H. B.—H. E. W.—H. B. P.—F. A. A.—C. V. M.—F. R.—R. M.—G. H.—R. T. A.—H. W.—T. J. W.—W. J. S.—Fire (no name).—C. O. G. N.—H. F. H.—W. M. C.—W. M.—J. D.—M. H.—A. T.—C. A.—S. S.—W. S.—E. S.—G. N.—E. J. J.—R. L.—W. F. P.—G. B.—T. S.—B.—R. O. O.—C. J. W.—C. D.—J. D.—G. J.—C. A.—J. C. M.—F. J.—J. W. G.—S. A. S.—H. C.—F. R. S.—J. W.—F. R. R.—H. L.—J. R.—C. A. F.—A. N.—J. E. M.—E. D. H.—T. W.—E. W.—F. M. B.—L.—W. E.—E. T.—R. M.—S. S. W.—G. O.—R. R.—C. J.—H. C.—C. C.—M. J. C.—B. C.

FURZE MITES.

By the Rev. W. W. SPICER, M.A.

THROUGH the kindness of a friend I have been furnished with a liberal supply of the curious, sociable, web-forming mite, noticed at p. 124 of last volume, as forming colonies on the common furze (*Ulex Europæus*). It would appear from that notice, that Dr. Milner Barry was the first to draw the attention of the scientific world to this little Acarus, and that he transmitted specimens to Mr. Meade, the arachnologist, in 1855. The latter states, in his reply to the doctor, that the animal and its cocoon are both new to him, nor can he anywhere find a description of them. This account was read before the Entomological Society that year; and here, so far as I am aware, the matter was allowed to rest; at least, I have not myself come across any further communication on the subject.

In the absence of information at the hands of others, the following remarks may possibly be of service to some of the readers of Science-Gossip.

After careful examination, I can see no reason to separate the present species from the genus to which it was assigned by Dr. Meade—Tetranychus of Dufour. The mouth and the parts connected with it are marked by the characteristics common to that family; the palpi being remarkably stout, pointed, and longer than the labium. The prevailing colour of the body is red, with longitudinal bands of a darker shade traversing the sides. After death by immersion in spirits of wine, which destroys the red colour, these bands appear to resolve themselves into globular masses of some dark substance in the interior; at any rate, these masses appear for the first time after the true colouring matter has been removed from the epiderm. On the underside the body is of a uniform hue; but, strange to say, in addition to the red forms, there are mingled with them numerous specimens in which the abdomen is dark green, while the head, thorax, and legs are of a lively pink. Whether these are young ones or males (for they are much smaller than the red ones), I am unable to say. Walckenaer, in describing an allied species, *Tetranychus prunicolor*, in which there is a similar variation of colour among individuals, simply speaks of the green ones as "the little ones" (les petits). One thing is certain, that the green-coated specimens are all furnished with eight legs, and consequently cannot be *very* infantine; since it is universally allowed that immature forms among the Acarina are invariably six-legged. The eyes, which are in every case two on each border of the thorax, are prominent and conspicuous; being a very dark red in the red specimens, and a bright red in the green—shining out in these latter with the same intensity and distinctness which characterizes the eye-spots in *Euglena viridis* and similar infusoria.

In shape, the body is long, with a tendency to oval; more so in the green than in the red specimens. In the former, too, the sides form an uninterrupted line from the thorax to the extremity; whereas those of the latter have two or three deep indentations, corresponding to the abdominal segments. The dorsal surface is marked (as in most of the Trombididæ) with very fine transverse lines; and is divided into four segments, of which the thoracic is unusually large. They are very distinct in the red, less so in the green individuals. The body generally is covered with stiff white hairs, or spines scattered over its surface (but not so plentiful as in many Acari), and mostly directed backwards; while those on the eight legs, where they are far more abundant, all have a forward direction; the end ones becoming slightly curved. The legs are rather slender, marked, like the back, with very fine lines, and divided into seven joints,

of which the first and second are short and stout, the third by far the longest, while the last is thin, transparent, retractile, and furnished with four claws. There is no "pulvillus" or sucker situated between the claws, as in most of the Acari; for the very sufficient reason that such an instrument is scarcely needed by a creature which, in its natural condition, seldom if ever places its foot on a smooth polished surface. Living as they do on a web composed of innumerable threads, they are furnished with a far more efficient and useful apparatus in the four claws (an unusually large number) and a tuft of stiff hairs which lies at their base, and which, I have little doubt, is intended to aid them in cleansing and disentangling the threads; answering in this respect to the comb-like processes with which so many of the spiders are provided.

The claws themselves are exceedingly elastic, the horny substance of which they are composed being seen to give way before the pressure of the covering glass, again recovering itself when the pressure is removed. They are also very flexible, bending inwards like the fingers of a human hand, when the last joint of the leg is retracted. Doubtless, this provision enables the tiny animals to lay firm hold of the threads of their web, and to grasp them tightly when running across it, or when shaken by the wind or a blow. The web is an interesting object, of a blueish colour when complete, and made up of innumerable separate threads of a uniform texture and appearance. I have never been able to detect exactly the manner in which the web is formed, as the spinning apparatus is situated on the lower surface of the abdomen, and the movements of the animal are far less sluggish and dull than in many of their fellow-Trombidians. All the observer can see is a continuous thread, which seems to have no limit, issuing from below the little creature, and following its movements in every direction. I should imagine that the spinneret is situated at about the third quarter of the abdomen, counting from the head, because when the animal is disturbed in its onward path, and turns suddenly to the right or left, the thread may be seen coming out from between the two posterior legs. It is curious to watch the tiny spinner in such a dilemma, raising its legs and stepping over the obstacle formed by the thread with the utmost *sang froid*. The thread has no little strength and tenacity, for I have seen it pressed with considerable violence, and without breaking, against one of the hind legs, when the animal draws it "taut" in turning. The web is formed very quickly by the incessant action of hundreds of minute workers, apparently moving without fixed order or special object, crossing and recrossing each other at every possible angle, but in the end producing a network of tent-like form, bluer and thicker at the top than at the bottom. There are no glutinous threads at stated intervals, as in the webs of the true Arachnids, though the threads themselves are to a certain extent viscid throughout. I base this statement on the fact that when the little animal, in the act of traversing the stage plate of the microscope, twists itself about and moves in another direction, the thread invariably clings to the point where the turn occurred, and remains adhering to the glass, though of course no little stress is laid on it, as it tightens under the animal's onward progress.

In this transparent cone, which is woven at the apex of a twig of furze, the little family remains enclosed, in active movement during the day, but each night retiring under the shelter of the gigantic tent-pole or column, which forms the centre of their home. Gradually, however, they extend themselves on each side, and although, as far as my observations extend, they never voluntarily leave their "cocoon," no doubt numbers of adventurous youngsters who are eager to see the world from the outside of their silken canopy, get blown away during high winds and violent storms, and thus extend the bounds of their habitation very much against their own will.

In spite, however, of their great fecundity, and their probable dispersion by means of the wind, these mites seem to be anything but common. We have seen that in 1855 they were unknown to Dr. Barry, and to "the Arachnologist," Mr. Meade; nor am I in a position to add any more information than what has been forwarded to me by Mr. White, of Budleigh Salterton, Devonshire, who says: "I have noticed them on our gorse bushes from time to time for many years. I cannot say whether they are to be found all the year, but I distinctly remember seeing some in December, January, February, and March. In the latter part of June I could not find one; and though I searched diligently, it was, I think, the end of August before I discovered any more, and these were in a locality in which I had not previously noticed any. I now know of only two or three bushes on which there are any."

I suspect the fact to be, that partly from their minuteness and partly from their web being so like that of some spider, they are constantly overlooked. But perhaps some of the correspondents of SCIENCE-GOSSIP may enlighten us on this point. I have succeeded in establishing a colony on a furze bush in this neighbourhood; greatly, by the way, to the amusement of my unscientific acquaintances! When last seen, about a fortnight ago, they had attached themselves to their new home, and were safely concealed under their canopy of silk, in spite of a good deal of rough weather; and I hope I may be able to report their well-doing in the spring.

Of the numerous species belonging to the present family of Trombidiidæ, described by continental acarologists, I know of but two that come at all near, either in structure or appearance, to the one

under consideration. These are Tetranychus ulmi, Koch, and Tetranychus lintearius, Dufour. The former is described and figured by Koch (Deutschlands Crust. 1, 11.) A figure is also given in SCIENCE-GOSSIP for 1867, p. 126. The latter is described and figured by Dufour (Ann. Sc. Nat., 1st ser., xxv., 281, Pl. ii., 4, 5), and also described by Walckenäer (Apt., p. 167). Tetranychus ulmi agrees tolerably well with the present species as regards its colouring; though the head, thorax, and legs are much too pink (rosenroth. Koch). Of Tetranychus lintearius, I have had no opportunity of seeing a figure; and certainly the description is brief enough to have satisfied Linnæus himself: "Red, legs of a lighter colour; hairs long; white on the dorsal surface and on the legs. It lives in societies on shrubs, on which it spins a delicate whitish web, similar to that of the spider. Observed at S. Sever." The above, meagre as it is, agrees in many respects with our species; which is of a red hue, has long white hairs on its back and legs, lives in societies, and spins a web. But I am afraid it would suit almost equally well for more than one other of the Acari. The legs of our mite, however, are not appreciably lighter in colour than the body; and in our species the dorsal surface is bordered by bands of a decidedly darker hue than the body itself. Moreover, in neither of the species named is there the slightest allusion made to the green individuals, which could hardly have been passed over by such careful observers as Koch and Walckenäer. Tetranychus ulmi is too far restricted in its habitat, being confined to the elm. Tetranychus lintearius too diffuse, being said to occur on shrubs generally; whereas the present species is, I believe, restricted to the furze or gorse.

As it appears that the subject of the present notice is not identical with any of the continental species, and that it has not yet found a place in our fauna, I suggest the name of Tetranychus ulicis (the Furze Mite) * as an appropriate title to distinguish it from its numerous congeners.

* *Tetranychus ulicis* (Furze Mite).—Body elongate-ovate, dark-red, opaque; sides lobate, marked by darker bands; of uniform colour below; sparingly clothed above with white hairs (spines?) mostly directed backwards. Legs rather slender, hairy (hairs all directed forwards, terminal ones incurved), seven-jointed; first and second joints short, stout; third joint longest; seventh thin, transparent, retractile, terminated by four claws with a tuft of stiff, brush-like hairs at their base: pulvilli wanting. Eyes two on each border of the thorax, conspicuous, darker in colour than the surrounding cuticle.

With the above are found other individuals (quere; young, or males?): body smaller: abdomen shorter, rounder, of a nearly uniform dark green colour; lateral margin continuous. Head, thorax, and legs pink. Eyes bright clear red.

Animals living in societies, forming a tent-shaped blueish web on branches of furze (*Ulex Europæus*).

Rare? Rusthall Common, Dr. Milner Barry, 1855; Budleigh Salterton, Devon, Mr. J. C. White, 1867.

GOSSAMER.

THE 10th of last November was a lovely autumnal day in Leicestershire. Strolling out for a walk with my children, we found the fields, both grass and ploughed, carpeted with a shining veil of Gossamer.

The sun was in the south-west, nearly down, and all the glittering threads seemed to lie in one direction—north-west and south-east. On careful examination, however, by several different methods, we satisfied ourselves that this was an illusion; that the threads were crossed and interlaced in a great variety of directions, but that only those which lay at right-angles to a line drawn from the sun to the observer reflected the sun's direct rays, and that only these therefore were visible at a distance. We caught a number of the clever little spinners. There seemed to be at least two species, one with the abdomen about as large as a mustard-seed, the other not more than half that size, and both rather dark coloured on the upper surface.

They would run nimbly about the hand, but did not appear inclined to leave it of their own accord. A slight shake, however, made them drop down several inches, and hang suspended at the end of a thread. It was a wonderfully calm day, and yet there was a sufficient current of air to move these delicate weathercocks, which all indicated that the direction of the current was from south to north. We watched them very closely, and noticed that for some seconds, or even a minute or two, they would wave about at the end of their thread without allowing it to be lengthened; and that then, suddenly, they would lengthen the thread and sail away in the direction of the wind. Generally, when they disappeared in this way, their flight was so rapid that they seemed to vanish like a flash, leaving their long streamer behind, which floated horizontally in the light air, and always in the same direction. But once, as I held and watched one of the larger species, he suddenly went off at so moderate a speed that I could see his little dark body against the light sky until he had got three or four yards away, when I lost sight of him.

We concluded, at first, that as the spiders always followed the direction of the wind, they were simply blown away, having the power of resistance at pleasure by checking the outflow of their thread. But there is one consideration which destroys this theory entirely. The velocity of a current of air, by which neither the blade of grass nor the leaves of trees are perceptibly moved, can scarcely be greater than one or two miles an hour; whereas the velocity with which these spiders shot away was certainly not less than four or five miles an hour. Plainly, therefore, there must have been some other motive force at work besides the air-current. What was it?

Loughborough. F. T. MOTT.

THE WOOD-SORREL.

IF there is one thing more than another which must attract the attention of the lover of Nature, it is the endless variety which is presented to him on every side. No human being could have arranged the wondrous sequence of the seasons, each lasting just long enough for us to see, and admire, and wonder at, and then passing away to give place to another, as beautiful and as charming as itself. Spring, with its fresh green, and its general awakening of bird and beast, insect and flower, makes room for bright and glorious Summer, with its bird music and gay floral train; then comes Autumn, with a rich mellow glow of golden harvest, followed by Winter, when Nature is as beautiful in sleep as she is when awake, and as she will be again ere many weeks are past. And so

> The old order changeth, yielding place to new,
> And God fulfils Himself in many ways.

I can think of nothing artificial which can at all compare with the nature-gardening of our hedges and fields, unless it be some old-fashioned garden of old-fashioned people (such as Henry Kingsley has so delightfully described), planted in those days, upon which we have so much improved, when people had not the opportunity and so could not know the advantage of having their flower-beds filled for four or five months with a painful blaze of scarlet Geraniums and yellow Calceolarias, leaving them empty and desolate for the remainder of the year.

But I am wandering from the subject of my paper—the Wood-Sorrel (*Oxalis acetosella*), one of the loveliest flowers of Spring, and one which is so common in most districts that few can have failed to observe. I have selected it from the various wild flowers which now present themselves because one or two of the features of interest connected with it are worthy of especial notice. I need hardly describe it—the threefold emerald-green leaf and the delicate white flower, with its purplish veins, are well known to all who give even a passing glance at our hedgebank blossoms.

In the first place, our Wood-Sorrel is an excellent weather-glass: both leaves and flowers close before rain; and the latter expand fully only in the brightest sunshine, drooping at even a passing cloud. But, more remarkable still, if its leaves be roughly handled, they will as it were shrink from the touch, droop, and gradually fold up, not in the same wonderfully instantaneous manner peculiar to the leaves of the Sensitive Plant (*Mimosa pudica*), but perceptibly, though slowly. If you gather a plant of Wood-Sorrel and carry it home in your hand, you will soon find that the leaves will close, and the flowers shrivel up and die. Curiously enough, the sensitive property of the leaves is more apparent in some specimens than in others. The manner in which the seed is sown by the plant itself is very remarkable. Some years ago, when I had even more to learn than I have now of the wonders of the works of nature, and when I had less opportunity of studying them, a kind friend sent me some roots of Wood-Sorrel. I thought it then, as I think it still, one of the loveliest things that I had ever beheld; and watched with wonder its leaves fold and unfold as evening succeeded to morning. Even when the blossoms had disappeared, I cherished the plants; and one fine morning in July was astonished to find what I believed to be a flower-bud rising among the leaves. Another and another appeared, and grew larger day by day. What surprised me was that they were not white, but green and swollen; and quite hard to the touch—that is, for a time: for one day, on handling one of the supposed buds, my astonishment may be imagined, when it flew open at right angles, scattering around a number of white, pearly-looking seeds! Such is the wonderful provision made for the dissemination of this little plant. It is curious to notice that the leaves of the Wood-Sorrel, when folded up for the night, will not reopen if placed in a room with artificial light; differing in this from the Trefoils and other night-closing plants. Many who are familiar with the beauty of the emerald leaves and pencilled flowers may not have examined the creeping root, on which are hard round knobs or scales, pink or bright red, and somewhat resembling coral. A striking variety of the Wood-Sorrel has been observed in some parts of England which has bright purplish-red blossoms, and contrasts very handsomely with our ordinary form.

Those who look on everything from a utilitarian point of view, will be glad to learn that the Wood-Sorrel is not merely ornamental, but useful. The essential salt of lemons, well known to ladies as a remover of inkspots from linen, is a form of oxalic acid prepared from its leaves. Gerarde tells us that our *Oxalis* "maketh better greenesauce than any other herbe or sorrell whatsoever;" and again, that "of all sorrell sauces [it] is the best, not only in vertue, but also in the pleasantnesse of his taste." The green sauce alluded to is still used as a fish-sauce upon the Continent. If further "vertues" be needed, the same author informs us that "it quencheth thirst and cooleth mightily an hot pestilentiall fever, especially being made in a syrrup with sugar."

The name Wood-Sorrel is possibly a corruption of the older one, Wood Sour: the names of Cuckoo Sorrel, Stubwort, and Sour Trefoil were also given to it. Gerarde says "the Apothecarys and Herbarists call it *Alleluya* and *Panis Cuculi*, or Cuckowes meate, because either the Cuckow feedeth thereon, or by reason when it springeth forth and floureth, the Cuckow singeth most, at which time also *Alleluya* was wont to be sung in churches," that is, at Easter. In Buckinghamshire a semblance

of the latter name is preserved: the plant being known as "Cuckoo's Vittles." In Wales, the blossoms are called "Fairy Bells." In addition to these, the *Oxalis* claims, and apparently with reason, to represent the emblem of a sister country—it is supposed by many botanists to be the veritable Irish Shamrock. We are all familiar with the beautiful old legend which tells how St. Patrick, when sent to preach the gospel to the Irish, utterly failed to bring to their comprehension the doctrine of the Holy Trinity. At length, almost in despair, he cast his eyes upon the ground, where he saw a Trefoil. Plucking a leaf, he said, "Is it not as possible for the Father, Son, and Holy Ghost to be one, as for these three leaves to grow on a single stalk?" "The act and word," says a modern writer, "were well adapted to fix the attention and convey the idea to an ignorant but imaginative people, and thus to fix on their memories the important truth of Revelation, though the solemn mystery itself can be explained by no earthly tongue, nor fully symbolised by any earthly emblem." The poet's idea of looking "from Nature up to Nature's God," could meet with no fitter illustration. The same tradition which has instituted St. Patrick the patron saint of Ireland, has allotted the Trefoil its floral representative.—In the first place, Mr. Bentham states that the White Clover (now usually regarded as the Irish Shamrock) "is believed to be of comparatively recent introduction in Ireland;" and as the visit of the saint is supposed to have taken place about A.D. 433, it seems pretty clear that, if this hypothesis be correct, the White Clover could not have been selected. Another argument, brought forward in favour of the *Oxalis*, is the fact that on March 17th, the day dedicated to St. Patrick, this would have its leaves fully expanded, while those of any *Trifolium* would be very small, and therefore unlikely to attract notice. But against this it may be urged that tradition does not tell us that St. Patrick's day commemorates *the gathering* of the Shamrock. In Fynis Morison's "History of the Civil Wars in Ireland, between 1599 and 1603," we read: "They (the Irish) willingly eat the herb Schamrock, being of a sharp taste, which they snatch out of the ditches." If this does not apply to the acid leaves of the Wood-Sorrel, it is certainly less likely to refer to the mild and insipid ones of any clover; and although the *Oxalis* does not grow in ditches, it may often be noticed on their banks. The poet of Ireland, Thomas Moore, speaks of the Shamrock, or "triple grass," as being

> As softly green as emeralds seen
> Through purest crystal gleaming;

and could any words more graphically describe the delicate hue of our Wood-Sorrel leaves, so different from the darker and more subdued colour of those of the clover? Many of the older writers refer to "curds and sham roots" as being the food of the poorer class of Irish in the early part of spring. Again, "the four-leaved Shamrock," so valuable as a charm and protection against witches, is rarely, if ever, met with in the *Oxalis*, though many have seen a four-leaved clover; and in the White Clover this malformation is of by no means unfrequent occurrence. It is but fair to suppose that part of the virtue attending it is due to its rarity in the *Oxalis*. A friend informs me that, while travelling in Ireland, the Wood-Sorrel was pointed out to him by a guide as the true Shamrock; but it must be admitted that the White Clover is more generally looked upon as its proper representative. However, any Trefoil will represent the traditional Shamrock; some of the small Medicks are sometimes considered to deserve the title, and a variety of the White Clover, having a dark brown spot on each leaflet, is frequently cultivated as such.

The *Oxalis* is pretty generally distributed over Great Britain, although in some districts, as in parts of Essex and Herts, it is far from common. It may be cultivated with little trouble under a bell-glass, or in a Wardian case, forming a beautiful drawing-room ornament. In a dried state, the appearance of the Wood-Sorrel is eminently unsatisfactory; the leaves turn yellow, and the flowers, if much handled, shrivel up altogether; and the whole plant looks so miserable when gummed down on paper, that it would almost deter one from trying the experiment again. B.

FOSSIL TEETH.

The upper Oolite which comes immediately under the Wealden or Hastings Sand, is replete with specimens of many of the Reptilia; but more commonly those of the shark-like family. The latter are very perfect in form, and in a good state of preservation; most generally they are found of a light slate colour, with a beautiful enamelled surface.

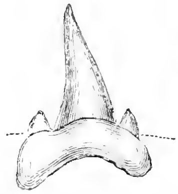


Fig. 38. Fossil tooth, nat. size.

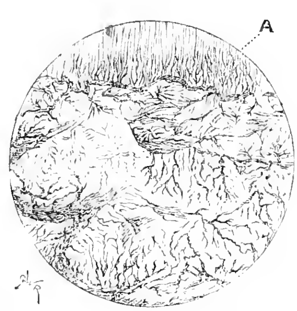


Fig. 39. Section of tooth magnified.

Fig. 38 is a specimen of the *Otodus obliquus*. Fig. 39 and fig. 40 show sections of the same tooth. The enamelled part at A in fig. 39 is of a yellow

shade, the other parts of the tooth being of a rich brown; but in some specimens which I have by me are of a bright amber hue.

This form is very common in the Wealden, and also in the lower greensand of the Cretaceous System, the only difference being that those found in the greensand are more of a brown colour; but otherwise in every particular identically the same as those of the Oolite which lies below. These teeth are fine objects for the microscope, and when examining them, you might think, with very little stretch of imagination, that you were looking at some beautiful forest scenery.

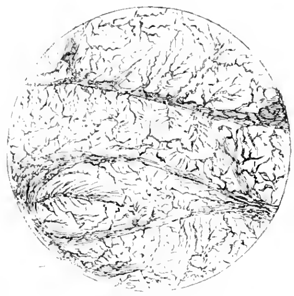


Fig. 40. Section of tooth magnified.

Our intelligent gardeners who are employed to lay out gentlemen's grounds, would receive valuable hints, "nay ideas," in such employment.

I think it will not be out of place here to refer for comparison to the teeth of the existing shark family; and fig. 41 represents a tooth of the Squallus or Blue Shark.

Fig. 41. Tooth of blue shark.

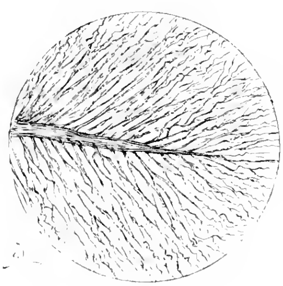


Fig. 42. Section of shark's tooth.

Fig. *b* on the dotted point of fig. 41, is that part of the tooth which is attached to the cartilaginous jaws of all the shark family; fig. 42 is a section at the dotted point *a* of fig. 41; and fig. 43 is a section at the point at *b*. This shark was caught by a friend of mine only two years ago in the Red Sea.

I may notice, for the benefit of learners, the method I follow to prepare these teeth, either fossil or otherwise, for the microscope, and which is simple enough. Procure a piece of fine smooth slate, and a dish of water; take the tooth and commence rubbing the flat side, keeping it under the water during the process, until you have ground it down to its centre. Be sure you have no scratches on the fine polished surface of the article you are polishing; then have a clean, clear piece of ordinary glass, and hold it over a small jet

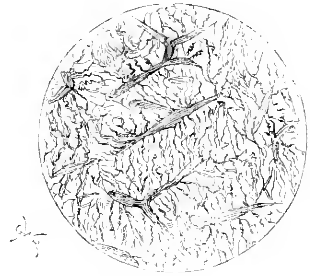


Fig. 43. Section of shark tooth.

with a little balsam on the centre of it, holding it to the flame till the balsam bubbles and boils well; remove your glass from the flame, and watch the air bubbles until they disappear; then place your polished side on the balsam, which very soon sets hard; immerse it in the water in your dish again, and rub away upon the slate the last side, until sufficiently thin and transparent for the microscope. Then fix a piece of glass on the polished section of the specimen in the usual way, and it is ready for inspection under your microscope.

South Shields. JOSEPH WRIGHT, JUN.

PLANARIA.—In SCIENCE-GOSSIP, for November, 1867, "E. T. Scott" inquires whether certain animals observed in fresh-water, the one with two, the other with four eyes, which "when touched contract themselves into a hard lump, as a healthy leech does," and which move in the same way—are *Planaria*. In reply, we beg to inform him that the Planaria have neither suckers, nor other visible locomotive organs, but glide from one place to another by means of innumerable cilia, with which their bodies are clothed. In the commoner species, the mouth is seated on the lower surface of the body, nearer the tail than the head, and when they feed they protrude from it a long trumpet-shaped proboscis. The animals described by him are classed with the leeches, and belong to the genus *Glossiphonia* (Johnson on the Medicinal Leech, 1816). The one is a very common and active little species, *G. bioculata*, which hatches its young in a kind of *marsupium*, where they remain for some time. It is a fearful sight to watch the mother and all her cannibal brood feeding on some poor worm. The other species is probably *G. complanata*, which has four or six eyes. It is a more sluggish leech, and does not carry the eggs about with it, but remains over them while hatched, as a hen sits over her eggs.—*B. C.*

THE SMEW.

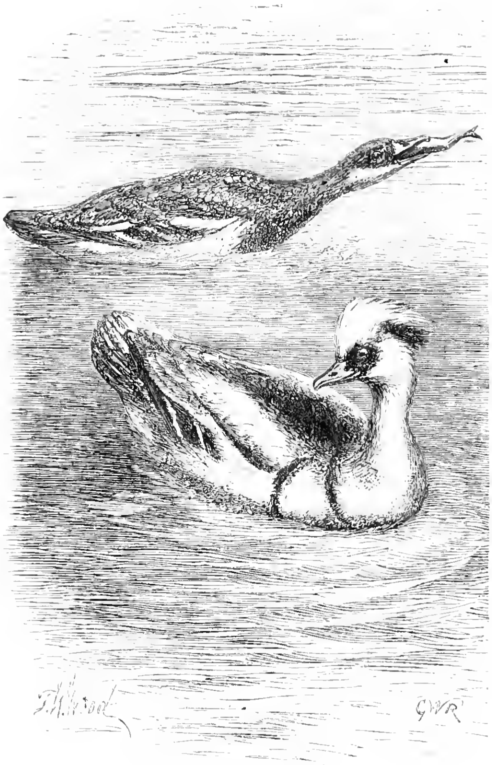


Fig. 44. Mergus albellus.

ONE of the handsomest water-birds which honour our islands with "a flying visit" is that of which we present a portrait, taken "from the life." The number of landsmen who have seen this beautiful stranger bear a very small proportion to those who have seen a swallow or heard a cuckoo. It is really but an occasional winter visitor, and the places it honours with a call are on the coast. Hence, as few visitors from the interior are to be found in our seaside towns at the time of its appearance, those who really have seen it alive, especially when mature and in good plumage, are chiefly the visitors at the gardens of the Zoological Society. If smews would take a hint, we should commend them for their discretion hitherto, and advise them never to venture upon a visit to the interior, where so many enthusiasts are sworn to the destruction of rare birds for the good of science.

This bird is something like a duck, but more like a Merganser. For the length of the bill, the form of the feet, and number of feathers in the tail, we must refer our readers to technical works. The general colour of the male is black and white, and its appearance in the water is indicated above. It is said to be a native of the Arctic regions, retiring southward in winter. The "Old Bushman," in his "Ten Years in Sweden," tells us that it is never seen on the south-western or eastern coast of Scandinavia, except in winter. "Breeds sparingly in the far north, but the egg is, I think, more difficult to obtain than that of any other Scandinavian bird, except the great auk. I fancy they breed more easterly in Siberia. The egg in my collection was taken out of a hole in a tree between Iockmock and Quickiock, in Lulea Lapland. The year before a golden-eye had bred in the same hole. The egg is so like that of the widgeon in shape, size, and colouring, that it is difficult to tell one from another; but the widgeon never breeds in a tree. I believe, when placed under a microscope, there is some difference in the texture of the shell."

The manners and customs of such a stranger are little known to us, except that it is an expert in diving, good at flying, and dexterous in eluding the sportsman. Male and female differ so much in appearance that they were by some of the older naturalists considered as distinct species, and Old Bewick figures the female as the "Lough diver."

This bird is generally represented as feeding upon fish, crustacea, and other aquatic creatures; but the Rev. L. Jenyns records an instance of a smew which was shot in Swaffham Fen, having the stomach entirely filled with vegetable remains, consisting apparently of some species of seaweed. Was this bird a "vegetarian" by accident, or the force of circumstances, or are they more indiscriminate feeders than they have been supposed to be?

TRACES OF THE GIANTS.

IN the second volume of SCIENCE-GOSSIP there appeared an interesting paper entitled "The Track of the Pygmies." I have long thought that another, equally instructive, might be written upon those monstrosities of the human race known as "giants."

It is quite a mistake to suppose that the giants of antiquity were abnormal phenomena, like "the Norfolk Giant" and other celebrities of our own time; they were veritable races of men of a stature far exceeding even the Patagonians of South America. We learn from the Scriptures that giants lived before the flood: these are probably the Titans of tradition, whose daring impiety provoked the Deluge. After the flood we find gigantic races—the Emim, Anakim, or Rephaim—inhabiting Palestine; and therefore we may infer either that one of the wives of Noah's sons was of gigantic stature, or that, coming of this race, some of the children subsequently reverted to it, in conformity with a well-known law of nature. Whatever doubt may exist upon the subject of the antediluvian giants, none whatever can possibly exist regarding these Anakim, or Sons of Onk, for we are expressly told that the

Israelites "felt as grasshoppers before them," and the height of one of their kings is incidentally noticed. These giants lived along the mountain chains of Canaan, ruling an inferior race known as Amorites. They had military outposts in the valleys, and dominated over the rich pastoral plains beyond Jordan, especially Bashan, in one part of which—Argob—"sixty great cities fenced with high walls, gates, and bars, besides unwalled towns a great many" were taken by Jair, and are still to be seen in ruins. From these and other facts it will readily be seen that their intellectual capacities were fully equal to their physical development; and a still further proof of this is, that one of their capitals was called Kirjath-Sepher or "city of archives." Joshua captured and burnt these in his third campaign. It will be seen how eminently appropriate to this great pastoral race was the epithet "Shepherd Kings," and there seems no doubt that these are the "Hyksos" who conquered Egypt, and are commemorated upon the walls of the old temple of Karnak.

The three celebrated capitals of the giants were Ashtaroth-Karnaim, Kirjath-Sepher, and Kirjath-Arba; Jebus (Jerusalem) was also a colony of the Rephaim, and thence came Melchisedek, probably a sort of Canaanitish Zoroaster or Confucius. The giants appear to have become very rapidly extinct. As they were talented in war and strong in person, this appears extraordinary, but possibly the same causes which induced the extirpation of the mammoth and other large mammals may have affected the giant races of antiquity. Sir S. Baker is of opinion that the elephant, rhinoceros, and larger mammals can scarcely survive the present century, at the present rate of destruction. Years after, Og, the last survivor of the giants, is found ruling over the old stronghold, Bashan. The remnant took refuge amongst the Philistines, whence issued, in the time of Saul and David, the giant champions—Goliath, Lahmi, and Sippai.

An interesting question suggests itself: Were the giants confined to Palestine alone? We have earlier (authentic) records of the history of Palestine than of any other country, and, finding giants there at a very remote period, may we not reasonably premise that, if we had similar information regarding other countries, we should find gigantic races in them also? But we are not left altogether to conjecture, for oral tradition (especially of Celtic nations) and archæology both favour the theory that giants were widely distributed at least over the countries which border the Mediterranean. It may be objected—Why are their bones not discovered if they were so widely distributed? To this it may be replied that until they are found in Palestine, where we know the giants once existed, we cannot logically dispute the existence of gigantic races in other countries, on the ground that no remains are found. Respecting the archæological proofs to which I have adverted, the philosophic Schlegel remarks in his "Philosophy of History" (p. 106): "There exist also monuments, or rather fragments of edifices, of the most primitive antiquity, which, as they are connected with the subject, are here deserving of a slight notice. I allude to those cyclopean walls which are to be found in several parts of Italy, and which those who have once seen will not easily forget, nor the singular stamp of antiquity they bear. In this very peculiar architecture we see, instead of the stones of the usual cubical or oblong form, huge fragments of rock rudely cut into the shape of an irregular polygon, and skilfully enough joined together. Even the great and often-admired subterraneous aqueduct or *cloaca* of ancient Rome is considered as belonging to this cyclopean architecture, remains of which exist also near Argos, and in several other parts of Greece. These edifices were certainly not built by the celebrated nations that at a later period occupied these countries; for even *they* regarded them as the work and production of a primitive and departed race of giants; and hence the name the monuments received. When we consider how very imperfect must have been the instruments of those remote ages, and that they cannot be supposed to have possessed the knowledge in mechanics which the Egyptains, for instance, displayed in the erection of their obelisks, we can easily conceive how men were led to imagine that more vigorous arms, and other powers than those belonging to the present race of men, were necessary to the construction of those edifices of rock." The cyclopean remains in Italy and Greece are apparently progressive, and yet perfectly distinct from the Etruscan and Latin styles of architecture. The walls of Tiryns, near Nauplia, alluded to by Homer, and those of Lerma, in Italy, are examples of the ruder style; those of Mycenæ and Epirus of the more advanced; in these the blocks are carefully fitted together. And not only are these ruins found over Greece and Italy, for Asia Minor, Phœnicia, Persia, Malabar, Brittany, Great Britain, and even North and South America, afford examples of cyclopean architecture. Now, in most of these cases, popular tradition refers the origin of these relics to giants. In Italy and Greece they are attributed to the Cyclops, a primitive race of giants, skilled in architecture, whose leader was said by Homer to be one-eyed, and hence this peculiarity was extended, by subsequent writers, to the whole race. In Malta is a remarkable cyclopean structure, supported on huge pillars, and popularly called "The Giant's Grave." Some of the blocks of stone are thirty feet long. Stonehenge itself was said by Welsh tradition to have been built by "giants who came from Africa." This is significant, since the Carthaginians, the greatest employers of mercenaries, colonised a portion of England and

Ireland. The very names of some of the British cyclopean antiquities show the evidence of tradition as to their origin, as, for instance, "The Giant's Bed," "The Giant's Grave," "The Giant's Load," "The Old Wife's Lift," "The Giant's Quoit," "The Hag's Bed," &c. In Brittany it is very curious that the grandest relic of antiquity, a whole valley full of huge stones, is called "Carnac"—a name evidently identical with that temple in Egypt upon which the exploits of the Rephaim are recorded.

A curious light has been lately thrown upon the antiquities of Western Europe by the discovery in the old region of the giants, now inhabited by the Druzes, of the homes and cities of the Anakim. The Rev. Mr. Porter and Mr. Cyril Graham have found the whole of ancient Bashan covered with ruins hitherto unknown to Europeans. In the cities of Kerioth and Kiriathaim are houses strong enough to resist the violence of man or of nature; the roofs are formed of beams of stone in juxtaposition, twenty-five feet long, supported by square stone pillars, and huge doors, formed of a single stone. "These ancient cities of Bashan contain probably the very oldest specimens of domestic architecture now existing in the world," says Mr. Porter.* In conclusion, there is no doubt that the *cromlechs* of Celtic countries irresistibly suggest the idea of habitations; indeed no other use can be assigned for them. Their height is too great for use as altars. It is just possible that the vast physical and mental powers which characterised the giants may have caused their deification when extinct by inferior races, and thus their temples and residences might even come to be regarded with superstitious, respect or copied and reproduced as objects of worship. At any rate, *this* cannot be denied—giants once existed as races, not as individual exceptions. That they were confined exclusively to Palestine, I have shown to be, to say the least of it, improbable.

That these remarks may interest some one in the subject is my sincere wish; and if they tend to throw any light upon the origin of some of our most curious antiquities, they will not have been made in vain.

F. Allen.

A Tale of Two Cities.—The Cheyenne papers having asserted that their city, boasting a population of seven thousand inhabitants, was probably the only city in the world free from rats, the Salt Lake *News* replies that its city is a place twice as large as Cheyenne, and twenty times as old, yet the presence of one of these generally well-known rodents in Salt Lake would prove as great a natural curiosity as a chimpanzee in the streets of New York.

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* See Porter's "Giant Cities of Bashan." Nelson.

FOSSIL INFUSORIA.

Every tyro in microscopic inquiry has, among his other curiosities, obtained at least one slide with the label "Fossil Infusoria." These are Diatomaceæ, and the deposits from which they are derived may be found in all parts of our country, cropping out on the borders of ponds, or underlying layers of peat. It is, however, often a matter of doubt, especially in the former case, where the forms of the deposit and those still living in the water are apparently identical, how far these may really be entitled to the designation of "fossils." That they are so in many cases, and almost always when underlying beds of peat, is shown by the entire absence in these latter of certain species (especially *Nitschia* and *Synedra*), while these species are *growing* in the waters of the same locality in the greatest profusion. The period of the introduction of these species, then, must constitute one epoch in the geological history of the Diatoms, and more attentive study will yet reveal the occurrence of similar special epochs in the case of other species, even though we may not be able to directly synchronize these epochs with those determined from other data. But, leaving the region of uncertainty, there are numerous deposits, the great antiquity of which is placed beyond a doubt. Among these we may first enumerate a deposit in which were found imbedded, in 1843, the bones of a Mastodon, in Orange county, N.Y., and which, from its peculiar connection with these bones, was undoubtedly of contemporaneous origin. Being unaffected by severity of climate, it is probable that the Diatoms continued to exist through the whole Post-tertiary period, affording, by the entire absence of marine species, another confirmation of the much-disputed Glacier theory of Professor Agassiz. Again receding, the next deposits of which the age may be considered as definitely fixed, are those of Virginia and Maryland, the most celebrated of all diatomaceous earths, from the extreme variety and beauty of their forms, and the extent of the beds containing them. These beds, when they underlie the city of Richmond, are not less than twenty feet in thickness, and consist entirely of marine remains; while deposits, similar in character, and probably contemporaneous in origin, are found at many localities as far as Piscataway, in the State of Maryland. They are referred by their discoverer, Professor W. B. Rogers, to the Miocene Tertiary. One cubic inch of the earth has been calculated to contain not less than several millions of individual shells. Many similar deposits have been observed both in America and Europe, but little has as yet been done in determining their precise age, or in accounting for the conditions necessary for the local accumulation of such vast quantities of material. Among the most remarkable

in this respect are those of our western coast. I have now before me a block of pure diatomaceous earth, a foot and a half long by half a foot in depth, of chalk-like whiteness, sent by Mr. W. P. Blake from Monterey (the entire weight of which is only about six pounds), and other similar beds are found at many points in Mexico, California, and Oregon. One of these, discovered by Colonel Frémont on the Columbia River, surpasses all other known deposits, being not less than 500 feet in thickness, and covered by at least 100 feet of compact basalt and other volcanic products.

It is probable that the Mexican and Californian beds, like those of Richmond, are of Tertiary age, though some of them may prove to be Cretaceous. That those of Monterey and San Francisco are far more ancient than the present physical features of California, is proved by their being purely marine deposits, and by their differing wholly in character and species from other deposits, also of considerable thickness, from the eastern side of the Sierras, which I have lately had an opportunity of examining. These latter are fluviatile or lacustrine, and contain many species identical with those of the ordinary subpeat deposits of the Eastern States.

In passing from the Tertiary to earlier formations, the evidence of the existence of the microscopic Algæ becomes less evident, and for a long time none were believed to exist of more ancient date than those above alluded to. Certain peculiar organisms termed Xanthidis were, however, observed as of frequent occurrence in the flint nodules of the chalk formation, and within a still more recent period similar forms have been observed in the analogous horn-stones of the Devonian and Silurian ages, associated in this latter case with unequivocal Diatomaceous shells. As regards these Xanthidia, which have usually been regarded as remains of Desmids, it is certainly singular that, while all recent Desmids are purely fresh-water, these should occur in marine deposits; and secondly, that, destitute as they are for the most part of the siliceous shell of the Diatoms, they should occur in a fossil state at all. Yet the resemblance is certainly a stricking one, and their occurrence with the kindred Diatomaceæ throws some degree of plausibility upon this belief. However this may be, the existence of one group at least of these organisms being established for these early periods, we can scarcely doubt that their numbers were as great then as in the seas of our own day, and that they have been present through all the great geological ages, even though metamorphism and other agencies have for the most part obliterated all traces of their beautiful but fragile shells. It is highly probable that accompanying the lower forms of animal life, these humble types of vegetation were among the first introduced upon the globe, performing then, as their representatives now do in the arctic seas and at great depths, where the higher forms of vegetation are wanting, the part of purifying the waters, as well as of contributing food for the sustenance of the different forms of animal life with which they were associated.—*Professor Bailey, in "American Naturalist."*

THE FLYING SPIDER.

AMONG the hundred varieties of spiders. there is but one of the real flying kind, although the "cat spider," that always leaps on its prey, instead of entangling it in his web, will sometimes swing off by its thread, and various other kinds will be blown from one tree to another, and weave their gossamer with geometrical precision in mid-air between them; yet none of these indulge in balloon voyages.

The flying spider is a pale, light, ashy coloured insect, or rather animal, and in this latitude thousands of these little aeronauts may be seen every autumn, vieing with each other in sailing the highest. They seem to be chemists as well as mechanics. They get themselves in a state somewhat like the silkworm before it begins winding its cocoon; nearly all that is inside of their bowels is formed into silken thread, and being thus rendered very light, they wait for a fair day and gentle breeze, when by hundreds and thousands, like birds of passage, they undertake their airy journey. Firstly, they climb upon some shrub, tree, or fence, where they stand awhile with their legs directly under the body, and to all appearance inflating themselves with gas, until the back part of their bodies become semi-pellucid. When fully ready, one does not wait for another, but proceeds to attach its cord to the object on which it is standing, then leaps up and off, fearlessly giving its body to the breeze, gradually rising like a kite until it reaches the end of its string, being generally high up and out of sight. I presume a moderate breeze would carry them a long distance after their thread was broken. I have seen them rise higher than the tallest trees, and disappear in the blue ether, but I have never failed to bring them down when suddenly cutting their thread as soon as they had made their leap. If, however, they rise twenty or thirty feet before their thread is broken, they are safe, for the breeze will carry them out of harm's way, though they will then rise but slowly. Occasionally, after one has started, another will run up his line with great rapidity some fifteen or twenty feet before throwing itself to the breeze. On the whole, it is both interesting and entertaining to observe their movements.—*H. L. Eades, in the "Scientific American" of Feb.* 15, 1868.

A BUNDLE OF BOOKS.

THE topmost of the pile of books on the naturalist's table just now, and we doubt not of many others, is Mr. Charles Darwin's new work on "Animals and Plants under Domestication," just published in two volumes. At present that is all we know of it, and hence cannot be expected to enlighten others.

WHOLESOME FARE; or, The Doctor and the Cook. By E. S. and E. J. Delamere (Lockwood & Co.), is a thick volume of nearly 800 pages devoted to the very important subject of good food and how to cook it. Cookery books and "Family Doctors" are usually a most uninteresting kind of literature, but herein is an exception. Although fried puff-balls, champignons, and other savoury fungoid delicacies are omitted, there are plenty of others, and no physician could give a better prescription to secure health than "Wholesome Fare."

COLEOPTERA HESPERIDUM, being an enumeration of the Coleopterous Insects (Beetles) of the Cape Verde Archipelago. By T. Vernon Wollaston (Van Voorst). This is successor and companion to its author's enumeration of the Beetles of the Madeiras, Salvages, and Canaries, and is a valuable contribution to entomological literature. The introductory remarks on distribution are interesting and useful, and almost every species is followed by practical observations which those will best appreciate for whom the work is designed—viz., the scientific students of this branch of entomology. It does not profess to be a *popular*, but undoubtedly it is a sterling *scientific* work, for which the name of its author is sufficient guarantee.

THE NATURALIST'S NOTE BOOK has completed its first volume, and is a judicious selection of tit-bits relating to natural history from the literature of the day. The mistake which commences its second volume is unfortunate, but cannot pass unnoticed.

ORGANIC PHILOSOPHY, Vol. II., Outlines of Ontology, by Hugh Doherty, M.D. (Trübner & Co.) is far beyond our comprehension. We have read as far as this:—

"Within the limits of our monocosmic solar system, we have to study secondary groups of pericosmic orbs, single globes or comets, and the subordinate realms of nature upon the crust of an individual planet. To these degrees of secondary subdivision we may apply the words pericosmics, orbicosmics, and epicosmics. The general denominations of cosmics and hypocosmics are subdivided in the following manner:

Cosmics .... { 6. Pancosmics.
5. Nebulocosmics.
4. Galactocosmics.
3. Zodiacosmics.
2. Polycosmics.
1. Monocosmics.

Hypocosmics ... { 3. Pericosmics.
2. Orbicosmics.
1. Epicosmics.

Orbicosmic is a hybrid term, but asterocosmic or planetocosmic would not be sufficiently definite."

When our author publishes a new Dictionary of the English Language with his own additions, we may try by its aid to read his book. It's of no use trying now—we can't do it.

ANTS.

IN the second volume of the *Entomologist's Monthly Magazine* Mr. Frederick Smith gave a list of the species of Ants known to inhabit this country. Some of these have from time to time been alluded to in these pages. The writer of the article in question states that in 1851 only eighteen species were numbered as British, whilst, in 1865, there were ascertained to be thirty-two. First and foremost is the "Wood-ant" (*Formica rufa*), of which we give an illustration from Professor Blanchard's work on the "Metamorphoses of Insects," noticed in our last number. (See also SCIENCE-GOSSIP for 1866, p. 150.)

Then follow eleven other species of the same genus, of which six are generally distributed, and five are local. Of the former is the "Mining Ant" (*Formica cunicularia*); the "Ash-coloured Ant" (*Formica fusca*); the "Jet Ant" (*Formica fuliginosa*), which nests in decaying trunks of trees, &c.; the "Garden Ant" (*Formica nigra*); the "Red-brown Ant" (*Formica umbrata*), which, together with the "Yellow Ant" (*Formica flava*), raises little hillocks in the ground.

Then follow the two species of *Tapinoma*, which are local, and two species of *Ponera*. These are succeeded by five species of *Myrmica*, of which three are said to be generally distributed. Almost all the rest are local. One of the best abused is the "House Ant" (*Diplorhoptrum molesta*), which makes itself too much at home in many London houses. Of this little creature a graphic account is contained in our first volume (1865, p. 170), and in the second volume (1866, p. 272), Mr. W. E. Shuckard continues the theme. Recently, others have written, not long articles, but imploring paragraphs, begging to be relieved, by any means, from the incursions of the "House Ant."

This reminds us, not only of the "Agricultural Ant," of which Dr. Lincecum has given such an interesting account, but also of the "Sauba Ant," which our friend H. W. Bates has almost immortalized in his "Naturalist on the Amazons;" and hence we pass into a dream of ant histories and ant stories, and whatever scores of naturalists and travellers have written about ants, between the days of Solomon and our own.

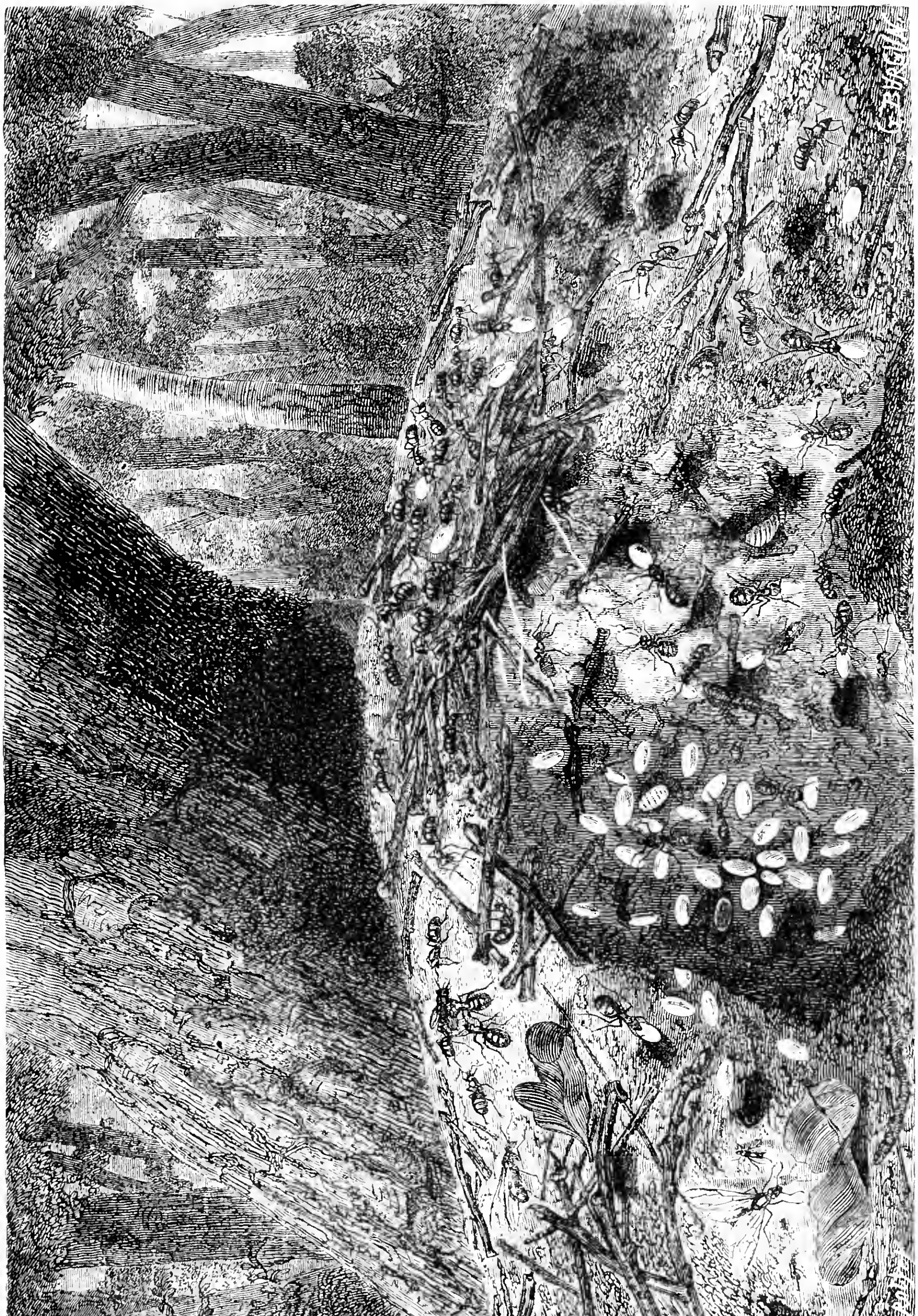


Fig. 45. The Wood Ant (*Formica rufa*).

GEMS OF THE CABINET.

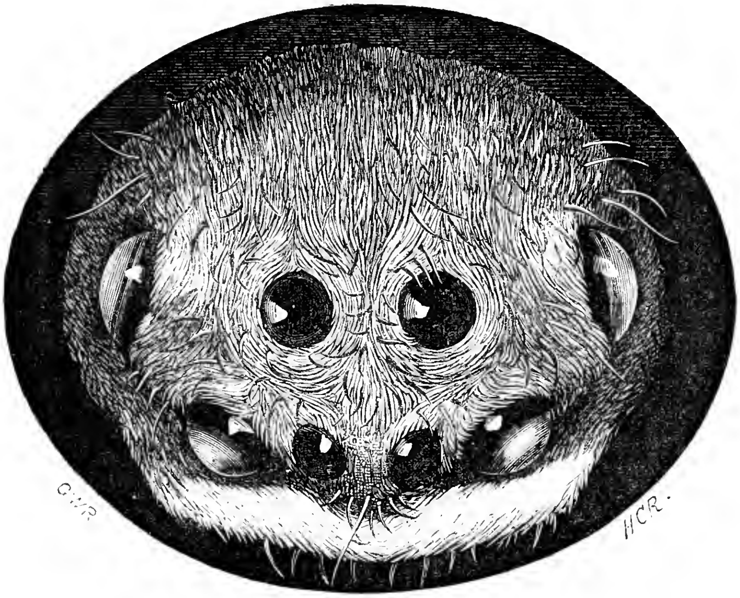


Fig. 46. EYES OF A TARANTULA, × 25.

IN collections of all kinds, whether they refer to nature or art, there must occur in the variety of specimens, some few of a greater value, distinguished from all others by their superior perfection or rarity; and thus placed apart as centres of interest and attraction.

Our conchological friend, for example, will show us drawers full of what, to our innocence, may appear to be beautiful shells; but he generally selects some particular specimen, and under such a name perhaps as Pseudoliva or Fastigiella, claims for it our admiration and our sympathy with his pride as its possessor.

This is especially the case with microscopic objects; and indeed it may be safely asserted that no collection, carefully selected and of fair extent, is without some two or three examples which, either from their rarity or beauty, may well be called the "Gems of the Cabinet."

Illustrations of slides of this order, accompanied by short accounts of their nature and the manner of their acquisition, would, we think, at once tend to awaken a wider interest in these studies, save many beautiful but perishable things from destruction, and assist the microscopist in his search for some of the more striking and rare objects with which to adorn his collection.

Our present subject is a slide showing the complete set of eyes of a Tarantula spider of the genus Lycosa. It is perhaps with the Kelner eye-pieces, and magnified to a diameter of eight inches, that it can be seen to the greatest advantage.

It was obtained from some *débris* of a collection once in the possession of the celebrated entomologists Kirby and Spence. No record of it was preserved; and to make out with certainty the exact species would be almost impossible. There is little doubt, however, that it is a South American spider, and most probably its true habitat is Colombia.

We extract the following notice of these animals from a treatise on the Invertebrata by Mr. W. S. Dallas:—

"The Lycosidæ make no regular webs, but take their prey by force; some of them running it down by swiftness of foot, whilst others spring upon the unwary victim.

"Perhaps the most celebrated of these spiders is the Tarantula (*Lycosa tarantula*) of Southern Europe, whose bite is supposed by the natives of Italy to cause death, unless the patient can be relieved by music and violent dancing."

Professor Owen says of the "Lycozæ," in his "Lectures on the Invertebrate Animals" (second edition), that "the poison glands extend into the cephalothorax," and this fact certainly gives probability to the commonly received tales of the danger consequent on wounds inflicted by their poisonous fangs.

Clean and complete sets of the eyes of the higher Arachnida will always make fine objects for the microscope; not only on account of their brilliant colour and bold stereoscopic effect, but from the wonderful and characteristic variety in the disposition of the individual organs.

Kensington. H. C. R.

ANOTHER NEW MOSS.

(*Hypnum Bambergeri.*)

DR. FRASER has again added a very interesting species to our Moss Flora, and having had the pleasure of his company in several botanical expeditions in the Breadalbane mountains last summer, I can bear witness to the untiring energy which he devoted to the search for our little treasures. Alpine botanizing is not always an agreeable pastime, for the poor bryologist may have to endure a daily soaking by the dense fogs which sometimes for weeks envelope the mountain tops, and shut everything from view; now creeping to the edge of some vast precipice he sees nothing, he hears nothing but the muffled plashing of the torrent hundreds of feet below; now clinging to the narrow

Fig. 47. *Hypnum Bambergeri.*
a. Plant, natural size. *b.* Branch, seen from above. *c.* Branch, seen laterally. *d, d.* Leaves. *e.* Leaf-base.

ledges on the face of some towering rock, exposed to the ceaseless drip from above, he must look well to his foothold, or there is *small* prospect of his ever travelling south again. But when it is fine weather he is amply repaid; the air so pure as to be almost intoxicating, the clouds sailing at you like huge tables supporting pyramids of whipped cream; at your feet an ocean of mountain peaks, disclosing here and there a glimpse of some silvery loch, and backed by the cloud-capped cone of Ben Nevis, with Cairngarm and Ben-Muir-Dhui, their snowy crests gleaming with unearthly splendour.

This last addition to our list was first discovered by Bamberger on the Stockhorn, in Switzerland, and afterwards by Sendtner on the Bavarian Alps. M. Mitters detected it in Dr. Lyall's collection from Beechey Island and Wellington Channel, and named it *Stereodon circularis*, and Berggren found it in the Dovrefjeld range in Norway. Dr. Frazer gathered it near the summit of Ben Lawer on July 27th, and his specimens agree perfectly with Alpine ones from Dr. Pfeffer. Its range appears to lie between 4,000 and 7,000 feet, and its position will be betweeu imponens and callichroum.

HYPNUM (§ Drepanium) BAMBERGERI, *Schimper.*—Dioicous in dense tufts, yellowish-green above, passing to yellow-fuscous or rufescent at base. Stem without radicles, subpinnate with a few fastigiate branches. Leaves densely crowded, secund strongly circinate, ovato-lanceolate elongated, entire, with a long acute point. Nerves two, faint; one usually longer than the other. Alar cells few, rather obscure, yellow; upper ones linear, elongate, pale. Fruit unknown, but female flowers are not unfrequent. Prof. Schimper erroneously describes the leaves as nerveless.

R. BRAITHWAITE, M.D., F.L.S.

ANIMALS THAT NEVER DIE.

YOUR correspondent asks (SCIENCE-GOSSIP, Jan. 1, 1868): "Will the reader be startled to hear that there are certain exceptions to the *universal* law of death—that there are animals, or at any rate portions of animals, which are practically immortal? Such, however, is really the case. I allude to the species of the genera Nais and Syllis." He then gives a short and inaccurate report of the observations made upon the fission or gemmation of these worms, and concludes as follows: "Whether the process goes on for ever . . . . of course no one can tell; but *if* it does—and there is no reason to suppose the contrary—then it is self-evident that the posterior portion of one of these worms, is, as I observed before, practically never-dying. It is simply fitted every now and then with a new head!" Now I have no doubt many of your readers *would* be startled by the above paragraph, and it must remind them of certain attempts to solve the problem of perpetual motion, which ought to satisfy others—but, that, as Mr. Dick could never keep out King Charles from his Memorials, so the impracticable word *if* will crop up and stultify the results. The process of prolification or gemmation in the annelids is yet imperfectly worked out, but the

observations of Quatrefages and Agassiz, and others have enabled us to understand its true import in many cases. The newly-formed individuals originated by the fission of the posterior rings, are in fact *Sexual zooids*. Just as in the tapeworms the numerous segments, which when ripe become detached and maintain a separate vitality, are Sexual zooids, destined to carry and disseminate the ova, so in *Syllis prolifica*, a species frequent on our coasts, "the anterior half—now an entire worm—continues to eat as before, and conduct itself as any independent annelid; but the individual formed by the posterior half is destined solely to the generation of its species. It does not eat; and its intestinal canal having become unnecessary, wastes and is atrophied. As, however, this part contained the whole generative organs of the primary individual, the life of it is prolonged by self-nutrition, long enough to permit the maturation of the numerous ova, and by their dispersion, and evolution afterwards, the race is continued and multiplied." The posterior segment or "tail" of course perishes, at the same time with the rings which were detached with it, and in truth its life is shorter than that of the anterior segment, which is the true representative of the species, and which may form a new tail, and in time undergo new fission, and develop new sexual buds. It is doubtful whether the phenomenon of fission in the fresh-water species, *Nais*, *Stylaria*, &c., has the same significance. I have frequently watched the process in Stylaria (*Nais proboscidea*, Müll.), and *Nais serpentina*, but could never satisfy myself that the new-formed segments differed in any respect from the anterior moiety. It is quite possible that I may be mistaken, but it seemed to me that in neither the old or new parts of individuals undergoing fission were ova or spermatozoa present. Perhaps the true sexual reproduction of these worms may be limited to certain seasons of the year; and in the meantime, as is observed in many of the lower animals and plants, the species is capable of indefinite extension by a sexual fission, or budding. Certainly, the tail segment, in these species, can claim no special immunity from death. The section generally takes place near the centre of the body, the head portion forming a new tail, and the tail portion a new head, with its eyes, mouth, and cerebral ganglia—truly a circumstance wonderful enough without endowing it with immortality! In a few days it is impossible to say which individual was derived from the head, which from the tail; and very likely we shall find both of them undergoing new segmentation, or, quite as likely, both may have perished! "There is nothing new under the sun,"—and the prelections of your correspondent remind us of the ancient belief that, the *os sacrum* was indestructible, and from it, as from a seed, the new body at the resurrection should originate.—*B. C.*

ZOOLOGY.

A Daring Hawk.—Old Powell, at Harrow Weald, was at work in his garden yesterday (June 7, 1863), when a sparrow dashed up against him, closely pursued by a sparrow-hawk. The hawk, nothing daunted by his presence, seized the sparrow, which had fallen at Powell's feet, and bore it screaming away.—*Harting's Birds of Middlesex.*

Wasp and Spider.—The recent discussion in your columns about the poison in the fangs of spiders may be taken to have set the question at rest. It explains a thing which has often puzzled me, the fact that spiders can hold their own in battle against such terrible adversaries as wasps. I have frequently put a spider and a wasp together under a glass, and forced them to fight. I thought it no cruelty, as they are *Arcades ambo*, both strong men, and perfectly well able to take care of themselves. When left alone under the glass they generally avoided one another, until irritated by being pushed together. When this was done, a terrific battle ensued, generally ending in the death of one of the combatants. When the spider was of the smaller species, the wasp always conquered, and on one occasion I saw a wasp *bite the spider in two* at the narrow part. But when the spider was of the medium size, I have seen him, just as often as not, kill the wasp; a result which surprised me extremely, not knowing at the time that he also was armed with poisonous weapons. I never pitted a wasp against the large garden spider, but I believe against him he would not have even "a chance." At least, a friend to whom I was speaking of it the other day, told me he saw a wasp drop off a ripe pear, on the ground, and instantly, before he had righted, a large garden spider pounced upon him and carried him into his den. Other spiders, however, consider sometimes that discretion is quite as good as valour where wasps are concerned. On this point I think books of natural history have not quite correct information. I have read more than once in books that spiders when a wasp is caught in their webs, knowing they have caught a tartar, immediately break away the web themselves to let him loose, in fear of his destroying it altogether in his struggles. This may sometimes, but certainly it does not *always* happen. Late in this present autumn, when out naturalising, my attention was attracted by the web of a geometrical spider, in the centre of which the owner was at work upon what seemed to be a round ball of spider-silk. On going up to examine it closely, I found it was a live wasp caught in the web, which the spider was tying up in the most artistic style, preparatory of course to regaling himself upon his corporeal juice. Keeping himself out of harm's way, he wound coil after coil round him,

until very little of the unhappy wasp could be seen. Anxious to see whether he could free himself, I took him away just as he was, and kept him in a box. He died the next morning still surrounded by his cords, having succeeded only in getting out one leg and one wing. I still possess his corpse, which makes a most curious object for the microscope, with the 2 inches or 1½ inches. The style in which the unhappy insect is corded is a study. If those two wonderful brothers—I forgot their names—who used to get themselves tied and put in a cabinet for the edification of wise Londoners, had been corded in such artistic style as this, I suspect that the spirits who (as we know) united them, would have been obliged to give it up—as the wasp was.—*S. L. B.*

BEE-EATER (*Merops apiaster*).—A beautiful specimen of this bird was noticed here some few months since, which, to use a common expression, seemed "hard up," for it darted into the stream after pieces of bread, which it quickly swallowed. Its flight greatly resembled that of the kingfisher.—*C. Denny, Kelvedon.*

INCREASE OF ANIMAL LIFE.—Compared with the rest of animal nature, infusory animalcules are undoubtedly the most numerous; next are worms, insects, and fishes; after these are the amphibia and serpents, birds and quadrupeds; and, lastly, man. The human female produces generally only one offspring at a time, and that only after a considerable interval from her birth, and but few during her whole existence. Many quadrupeds are subject to similar laws, while others are more prolific, their fecundity being little if at all inferior to certain birds; for they will produce twenty or thirty young at a time. Several birds breed frequently in a year, and will have more than a single egg at a time. How prodigious is the difference on descending to the classes, pisces, amphibia, reptilia, insecta, and annelida! Yet among them the numbers cannot be more different. According to naturalists, a scorpion will produce 65 young; a common fly will lay 144 eggs; a leech, 150; and a spider, 170. A hydrachna produces 600 eggs, and a frog 1,100. A female moth will produce 1,100 eggs, and a tortoise 1,000 eggs. A gall insect has laid 50,000; a shrimp 6,000; and 10,000 have been found in the ovary, or what was supposed to be that part, of an ascarides. One naturalist found above 12,000 eggs in a lobster, and another above 21,000. An insect very similar to the ant (*Mutilla*) has produced 80,000 in a single day; and Leeuwenhoeck seems to compute 4,000,000 to be the crab's share. Many fishes produce an incredible number of eggs. Above 36,000 have been counted in a herring; 38,000 in a smelt; 1,000,000 in a sole; 1,130,000 in a roach; 3,000,000 in a species of sturgeon; 342,000 in a carp; 383,000 in a tench; 546,000 in a mackerel; 992,000 in a perch; and 1,357,000 in a flounder. But of all the fishes hitherto discovered, the cod seems to be the most prolific. One naturalist computes that it produces more than 3,686,000; another as many as 9,444,000.—*R. C. Baigent, Woolston, Hants.*

THE STORMY PETREL (*Thalassidroma pelagica*).—A specimen of this pretty little bird was knocked down on the night of Jan. 21st, in the London road at High Wycombe. When brought to us the next day, it appeared very weak, but otherwise in good condition. It was placed on flannel in a basket, and slept during the night. Next morning we gave it a bath of fresh water, which it seemed to enjoy: we also gave it some bread-crumbs soaked in cod-liver oil, of which it took a few, appearing to relish the oil. On Friday morning, however, it was perceptibly weaker, and on placing it in a bath prepared with "Tidman's Sea Salt," it sank almost immediately. On Saturday it took a small quantity of oil, and in the evening we let it out in the drawing-room, when it flew the length of the room several times. On Sunday night it was unable to fly more than a very short distance, and on Monday it died.—*B.*

FASTING CATERPILLARS.—A remarkable case of long fasting in caterpillars has recently come under my notice. Two friends of mine, coming back from Russia, brought with them some caterpillars which they had found some time before they started. The caterpillars were carefully placed in a box with some leaves, and forgotten. They stayed in Germany a month, and then returned home to England. The whole time since the caterpillars had remained without food (for they did not eat the leaf which had been placed in the box) was about five months, and though they will not eat anything they are still alive. It is now eight weeks since I received them.—*A. H. Todd.*

RARE BIRDS.—During the month of January the following birds have occurred in Gedney Marsh, Lincolnshire. Great Northern Diver (*Colymbus glacialis*), Rednecked Grebe (*Podiceps rubricollis*), Eared Grebe (*Podiceps auritus*), Forktailed Petrel (2) (*Thalassidroma Leachii*), and the Storm Petrel (*Thalassidroma pelagica.*)—*C. R.*

EGYPTIAN GOOSE (*Chenalopex Egyptiaca*).—A specimen of this very rare bird was shot near Heybridge, by a foundryman in the employ of Mr. E. H. Bentall, January, 1868. Weight about seven pounds.—*H. Tasker.*

REMARKABLE SIZE OF THE TROUT.—A large trout was found stranded on the estate of Lady Rodney, Alresford, January 19, 1868. It measured 2 feet 4 inches in length, and weighed 14 lb.—*H. Tasker.*

Novel Mousetrap.—A short time since, as my sister was feeding her chickens, she observed a hen in hot pursuit of a mouse, which soon ended in the capture of the poor little animal. After giving it several violent shakes, the hen dropped the mouse, but on its showing signs of life she quickly swallowed it whole. Is this a common occurrence?—*H. Tasker.*

Origin of Dogs.—From the resemblance in several countries of the half-domesticated dogs to the wild species still living there—from the facility with which they can often be crossed together—from even half-tamed animals being so much valued by savages, and from the other circumstances previously remarked on which favour their domestication, it is highly probable that the domestic dogs of the world have descended from two good species of wolf (viz., *C. lupus* and *C. latrans*), and from two or three other doubtful species of wolves (namely, the European, Indian, and North African forms), from at least one or two South American canine species, from several races or species of the jackal, and perhaps from one or more extinct species. Those authors who attribute great influence to the action of climate by itself, may thus account for the resemblance of the domesticated dogs and native animals in the same countries; but I know of no facts supporting the belief in so powerful an action of climate.—*Darwin's Animals, &c., under Cultivation.*

Striped Hawk-moth (*D. livornica*).—As I see in your impression of last June this insect is mentioned as extremely rare, I think it right to let all interested know that I obtained two specimens last season, and a neighbour one the season preceding. Suspecting one of mine to be a female, I kept it alive some time; it laid a small number of eggs, and died. I think about thirteen of the eggs hatched; I placed them on a growing vine, in an airy box; some of them grew to about 1¼ inch in length, but all ultimately died. I believe they required some other kind of food. I should be glad to exchange one specimen for British Butterflies, or a work on British moths.—*F. A. Ramsey, Ridgeway, Plympton, Devon.*

Bittern.—A fine example of this very rare bird was shot in the parish of St. David, Pembrokeshire, early in January, and another was also seen about the same time.—*H.*

Baby Prawns.—I feel very much obliged to Mr. Henry Lee for so kindly correcting my unwitting mistake in January Science-Gossip. I should have said, "*To the naked eye*, the baby prawns are *apparently* the exact counterpart of their mother in everything except size." They were not examined under the microscope, hence the misapprehension.—*G. S.*

Humming-birds. — The best way to shoot humming-birds is to use a light short-barrelled gun, and very small charges of powder and dust shot—scarcely more than one layer of shot over the wadding. As you have to fire close, a larger charge would damage the beautiful tail feathers or other ornamental appendages. Having tough skins, there is less difficulty in preparing them than is the case with many much larger birds.—*H. W. B.*

Phthisis in Swallows.—In Science-Gossip of last month, the signature "Hennybel" was erroneously appended to an interesting communication on this subject from Henry Lee, Esq., F.L.S.

Fish Parasite.—I have an aquarium and a few common carp in it. One of these has for some weeks appeared very unwell; it would often sink to the bottom, and there stay for hours together. I noticed what I supposed to be a vein in the tail, but by constantly watching it I found that it moved. I took the fish in my hand, and with a needle split its tail, then with my thumb-nail tried to squeeze the insect out. I broke a piece off the first time, but afterwards succeeded in entirely removing it. It was a worm, about an inch and a quarter long. I placed it on the bottom of a cup; it moved after being taken from the fish; at the same time it was bleeding, and it soon shrivelled up. The fish has been better ever since. Are such things common? —*Charles Rudd, Jun.*

Unfaithful Figures.—Permit me to call attention to the inaccuracy of two plates in Science-Gossip for Febuary, from a work published by Germer Ballière. You have already noticed the decidedly unnatural position of the wings of *Papilio Machaon*, but there are other errors far more likely to mislead those who have not had an opportunity to examine this insect in its different stages. In the first place, the crysalis is represented attached to the plant inverted; in nature the head is always upwards. There would be no necessity for the silken thread that supports the body, if their habit was to suspend themselves head-downwards, as is the case with some insects. Then we have the caterpillars drawn with horn-like projections near the head; these I believe they only protrude when irritated, and not when quietly feeding, as the illustration would lead us to suppose. The chrysalis of Hornet Moth, from which the imago has apparently just emerged, is certainly much too large. Supposing half its length to be concealed from view, as it should be, it would describe a chrysalis as large as that of the Wood Leopard. No doubt the work referred to is, as you describe, a pretty book; but if it is intended to instruct the young entomologist, truthful representations would in all probability have succeeded far better.—*J. B. Waters, Crowndale Road, Oakley Square.*

BOTANY.

Chamærops humilis.—This is the dwarf palm of Italy, and the more southern parts of Europe. It is very useful as an ornament of greenhouses; its handsome fan-shaped leaves forming a beautiful contrast with those of camellias, oranges, rhododendrons, azaleas, and other simple-leaved shrubs. We scarcely ever get it above three feet high, although it is said to become a tree when very old. The following, copied from Landen's "Arboretum Britannicum," will probably interest many of the readers of Science-Gossip who feel disposed to give this plant a trial out of doors on their lawns or grassplots. I must, however, remind them that it is not "sufficiently hardy to withstand the winter climate of some localities in this country." Though this palm is designated dwarf, yet, according to the "Nouveau du Hamel," it grows to the height of 30 feet or 40 feet in Spain; and one in the Jardin des Plantes, in a tub, attained the height of 30 feet. In England, one in an old conservatory, at Buckridge House, near Godalming, was, in 1836 upwards of 12 feet high. The trunk of plants of this size is cylindrical, perfectly naked from ground to within a short distance of the leaves, where scales commence, of a reddish hue, being the base of the footstalks, which remain for some years after the leaves and petioles have dropped off; and which scales, with great plausibility, have been considered as giving the first hint for the foliaged capitals of Corinthian columns. "As this palm produces abundance of seed in Italy and Sardinia, if large quantities of it were imported, and the plants raised from it exposed to the frost, some would doubtless be found more hardy than others; and these might be perpetuated from the suckers which arise abundantly from the roots. The soil which this palm prefers is a deep sand, in which soil it is said to grow in the south of Europe, and spread over the surface in the same manner as the fern does in England. As a single object on a British lawn, few, in rarity and singularity, can surpass a fan palm. A plant has stood out in the open air, in the Edinburgh Botanic Garden, for several winters, with scarcely any protection." A fine specimen is also flourishing on the lawn at Dangstein, near Petersfield, Hants. The seed may be had of almost any respectable nurseryman for 4d. or 6d. per packet, which may be sown in March on a hotbed, and when the young plants appear treat them like any other greenhouse shrub, hardening them by gradual exposure to sun and air.—*George Newlyn.*

Pink Primrose.—This variety is certainly common in Pembrokeshire, but I think your correspondent (D. Tredegarville) is hardly correct in making the Yellow the exception. Both flourish abundantly, but the yellow predominates here as elsewhere.—*H. Hicks.*

Snowdrops.—On the 6th of February, "P. G." enclosed snowdrops in flower from a garden in a maritime parish in the south-west of Scotland, the name of which we cannot decipher. This is rather early so far north for the "fair maid of February."

Lichenology.—Dr. Lauder Lindsay has announced two works in course of preparation, "Outlines of Lichenology" and "Lichenologia Britannica," each complete in itself, but the former is intended to constitute an introduction to the latter. A work of this kind is much wanted.

Ivy Again.—The instances mentioned by your correspondents of ivy flourishing as "vigorous as ever," and "showing no signs of decay" after the communication with the ground had been entirely cut off, need, I think, to be very fully and carefully inquired into ere we receive them as conclusive and satisfactory proofs in favour. I do not for a moment object to accept those as very marked cases, in evidence of unusual power of sustaining vitality for a time; but I think I can also bring forward other evidence to show that this vitality, in all probability, only lasts for a certain time, increased or otherwise in proportion to the advantages present. Moreover, that the removal of direct connection with the ground (or other suitable source) does affect the vitality, and ultimately destroys the life of the plant. About ten years since it was thought advisable to get rid of the ivy then covering much of the eastern end of St. David's Cathedral, especially the walls of the Lady Chapel, where it flourished luxuriantly. For this purpose the stems, in every case, were sawn across from twelve to fifteen feet above the ground, and the whole of the lower portion cleared off, leaving only the upper parts undisturbed to wither and decay. In some instances this occurred also rapidly, but in most cases the symptoms of decay came on only very gradually, whilst others, for years, showed scarcely any indications of being at all affected. Year after year, however, some drooped, and at last the freshest and fairest, so that at the present time but few portions remain, and these in as sickly a state as possible, the remaining faint indications of life being only present in the highest branches, fed apparently by the last drops which they are likely to be able to draw out of the now hard and dead stems and adjoining branches. The miserable appearance, and sickly yellowish tint of the last lingering leaves, tell the tale of ten years' deprivation from a continuous stream of natural food, and look ill, indeed, in the face of those fresh and deep-tinted companions on an adjoining wall. Doubtless, position has much to do with accelerating or delaying decay. A barren and dry wall can yield little or no nourishment, while a mossy and moist trunk of an "old hawthorn" may yield a scanty sustenance for a proportionally long period.—*H. Hicks.*

MICROSCOPY.

Flea Cage.—A convenient mode of displaying living insects of various sizes is wanting even to those who possess the usual series of "live boxes" supplied by the best makers. The "animalcule cage" or "capillary tablet," invented many years ago by Varley, is only useful for putting up minute animals living in water, or other objects immersed in fluid. With a lively flea between your finger and thumb you will look in vain for an instrument capable of at once permitting and controlling its action. The best thing you can find for the purpose is perhaps the common live box sold with very cheap microscopes; but here your flea will be apt partly to hide himself behind the brass collar containing the thin glass cover; that is, if he has not already escaped during your endeavours to put him into the box.

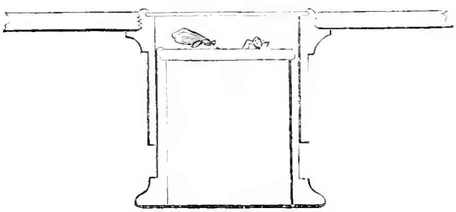


Fig. 48. Section of Flea-cage.

The above diagram is a section of a flea cage intended to supply this want. Its great convenience, and the variety of objects to which it may be applied, have been tested by more than a twelvemonth's constant use; very few things, in fact, come amiss to it, from a large bee to the most delicate Nirmus or the smallest Acarus; all can be imprisoned and viewed with ease by reflected or transmitted light, or with the spot-lens. Both glasses being burnished in, there is no collar to hide any part of the object; and as the box drops down into the stage, the object is not elevated above its surface, which is a great advantage; as it gives more scope for the use of objectives of the lowest powers. To those who would observe alive the many species of Aphides, flies, gnats, and small spiders frequenting our London gardens and houses, this form of inverted live box, or "Flea Cage," is recommended as an inexpensive and useful addition to the microscopic apparatus.—*H. C. R., Kensington.*

Wood Sections.—Few persons who have not studied the structure of wood by the aid of the microscope, are aware of the variety and beauty to be found in the arrangement of the cells, woody fibre, &c., of the various kinds; and some of your readers, who have little time for study and small means, may have looked with delight on the mounted specimens possessed by another, and been prevented from preparing any for themselves by thinking it needful to purchase one of the section cutters recommended in works on the microscope, but which may easily be dispensed with in the following manner. Having selected a clean healthy shoot of the wood to be examined, about ½ an inch or rather less in diameter and 3 or 4 inches long, cut off the top quite straight across the lower end obliquely, and shave off the bark about ½ an inch wide for 2 inches of the length; now hold your wood tightly in your left hand, while you carefully cut off a very thin slice from each of the cut surfaces with a very sharp knife or razor; soaking the wood in water for some days makes it easier to cut than if it is dry. If the sections are very thin, mount them dry; if rather thicker, so that the light does not easily penetrate them, in balsam. With care a section in each of the three directions may be placed under the cover glass, so that each slide is a complete illustration of one kind of wood. When mounted in balsam, the longitudinal sections are beautiful polariscope objects.—*T. Wheatley, Lewes.*

Dissecting Needles.—For some time past, I have been in the habit of using, as dissecting needles for the microscope, the small steel ticket suspenders made by Messrs. Myers & Son, of Birmingham. Fig. 49, *a*, shows the shape of the suspender as purchased. I straightened out the hook, as at *b*, with the aid of a gas jet, then hardened it, and fitted it to a cedar-wood handle. Finding the hardening and tempering rather troublesome, I made further inquiries, when I found that they could be obtained straight, so as to be ready for use at once. The edges may be sharpened so as to answer for cutting, as well as teasing out the tissues. The price is very moderate, the suspenders selling at about twopence per dozen here. I have asked Mr. Charles Collins, the optician, of Great Titchfield-street, to keep a few for inspection, and to supply those who want them. —*Charles Adcock, M.R.C.S., Birmingham.*

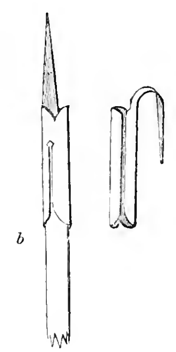


Fig. 49.

Soirees.—The most brilliant soirée yet given in connection with Microscopy was that of the Old Change Microscopical Society, which was held on the 17th February, at the Terminus Hotel, Cannon Street. Nearly 1,200 persons were present. The annual conversazione of the Quekett Microscopical Club will be held at University College, on Friday, the 13th March.

NOTES AND QUERIES.

The Winter Quarters of a Spider.—When out pupæ digging the other day, I came upon a moderate-sized spider completely entombed in the earth. It seemed to be rather dull, and, when any one touched it, would only move a short way. The cave, which probably had been hewn out by the spider, was shaped as an egg, and was lined with a fine web. In it there seemed to be only just room for the Arachnide with its legs in a very cramped position. Do spiders generally inhabit such a prison during the winter months? And, now we are upon the subject, I will put another question to any of your numerous correspondents who would venture an answer. Last summer I had a fancy for always carrying a bottle in my pocket when out for a walk, and in it I put four spiders (*Epeira diadema*), debating in my mind whether there would be peace or war. It turned out that the latter was the result, and a general fight ensued. The last comer, however, kept very sensibly out of the way of the jaws below at the top of the bottle, now and then descending a thread to have a snap at the combatants, escaping again unhurt. In a minute all was quiet, but the state of the game seemed to be that each was content to suffer pain as long as he inflicted injury on another; for the first had its jaws embedded in the abdomen of the second, the second behaved in the same polite manner to the third, who continued calmly to suck the juices of the first. In this way they formed a sort of triangle, and thus in each other's embrace, died in about five minutes. The other spider acted in its lofty regions as a judge. Now, the problem to be solved is, did these spiders poison each other, or did they die from the wounds inflicted, not taking into account the poison? Which is most probable?—*F. R. R.*

Sponges.—The books and papers to be consulted on this subject are, Dr. Johnston's "History of British Sponges," Dr. Bowerbank's "Monograph of the British Spongiadæ," Dr. Oscar Schmidt's "der Spongien des Adriatischen Meeres," Duchassaing and Michelottis' "Spongiaires de la mer Caraibe," Lieberkuhn's "Beitrage zur Anatomie der Kalkspongien," Dr. Bowerbank's "Monograph of the Spongillidæ," in Proceedings of the Zoological Society of London, part iii., December, 1863. Dr. J. E. Gray's "notes on the Arrangement of Sponges," in Proc. Zool. Soc., part ii., May, 1867, and Albany Hancock's "note on the Excavating Sponges," in the Natural History Transactions of Northumberland and Durham, vol. i., part iii., 1867, &c. &c.

Holly Berries Poisonous.—Several cases of poisoning from time to time have been brought under our notice, through children eating of the berries of the common holly, and it is to be feared that many more fatal cases through this cause have occurred without being suspected. The danger of placing holly berries, whether red or yellow, within the reach of children should never be forgotten by parents or servants; a hazard, which by-the-bye, never terror-struck me more than I was made so on Candlemas Day of the present year, in seeing a lot of little children from two years old and upwards, picking the berries from off the holly sprigs that had been used for the Christmas decorating of the cottage, and to their heart's content amusing themselves in the collecting all they could for a display in their little innocent games. Now I thought I would like to say a few words in Science-Gossip by way of caution, trusting that they may draw attention to a source of danger very little suspected by many persons. There is not one in a county who dreams that the berries, whether red or yellow, with which churches and country houses are so copiously decorated from Christmas to Candlemas, are little less dangerous than so many pills of red lead, or even arsenic. Though it is not a little curious that the berries of the holly tree should be never named as poisons, even by writers of vegetable products. *Orfila* is silent as far as can be discovered in a couple of heavy volumes without an index. *Christison* says nothing, at least not in the third edition of his book on poisons. The Materia Medica authors, *Richard Wood* and *Bache* treat the holly as a harmless tree. All that *Smith* could find to relate is that "The Druids are said to have introduced this custom (that of Christmas), for the accommodation of certain sylvan spirits of a chilly constitution while the oaks were leafless!" And yet he might have found something more worthy of science than such anility; for *Rembrandt Dodoens* had 250 years before announced that holly berries are purgative in doses of 10 or 12. There are, however, botanical writers who have pointed out the dangerous properties of these berries. *De Candolle*, in his "Flore Française" says they are purgative; *Achille Richard* quotes Dodoens; *Endlicher* in his Enchiridion describes them as being violently purgative (vehementius purgant); and in *Lindley's* "Vegetable Kingdom" their character is given still more distinctly: "the berries are purgative and emetic; six or eight will occasion violent vomiting." It would seem, however, that none of these authors had ever heard of fatal cases. Nevertheless *I* have, and further add that I possess a scrap of paper containing a report of a "Death from eating holly berries," which, singular to say, I came across by chance while penning my notes on the subject.—*George Newlyn.*

Expansion and Contraction in Fluids.—In the article on the "Temperature of Lakes," I find the following: "It is well known that water (unlike other fluid bodies) contracts during the process of cooling, until it reaches the freezing-point . . . . . . and that it again expands as it gets colder." Taken as written, this means that water is the only fluid that contracts in cooling. I do not think the writer meant that, as it is obviously incorrect; Mercury contracts in the thermometer, for instance. I take it, the meaning intended is that water is the only body that increases in bulk below a certain degree of cold. This is a statement very common in books. We are told that, while ice floats, all other solids sink in their liquids, and that it is a wonderful instance of a providential arrangement. One after another repeats this, and thus it obtains general credence. No one, however, tells us that he has tried the experiments necessary to prove this statement. Iron solid floats on molten iron, solid lead on lead, copper on copper, zinc on zinc, tin on tin; and so I might go on. Every solid I have ever noticed floats on its own liquid. True, when these fluids are poured into receptacles many degrees colder than themselves, they will solidify on the sides as well as the top, and so would water if treated in the same manner; and if, say, melted iron could be put into a vessel of as high a degree of temperature as itself, and the air in contact raised to a heat only a little below, it would solidify on the top and downwards even as water does. It is a general law applicable to all fluids that water obeys in increasing in bulk below a certain tem-

perature; and there is in this respect no special unlikeness to other fluids and solids in ice floating on water.—*Edwin Holmes, 1, Denbigh Terrace, Bridge Road, Battersea.*

The Herbarium Insect.—In answer to "B.'s" query as to the best mode of getting quit of this troublesome enemy of collectors, I should suggest a weak solution of corrosive sublimate in water, with which the specimens may be painted over with a camel's-hair brush. A collection of N. Indian ferns in my possession for the last twenty years were gummed to their papers, and some corrosive sublimate mixed with the gum, and an insect is rarely seen amongst them. But gumming specimens all over does not improve them.—*M. H.*

Herbarium Insect.—If "B." will put his dried plants into a tin or other close box with one ounce of benzine sprinkled amongst them, he will have no difficulty in getting rid of the insects. If this is done twice, at intervals of a week, he may feel quite secure. Carbolic acid will answer quite as well, but the smell is more permanently offensive. In mounting plants on paper, it is a good plan to mix bichloride of mercury, one grain to the ounce, with the gum which fastens them down, or wash them over with a solution of it in water, which should not be strong enough, when dry, to soil a black feather; it may then be applied with success to prevent mildew on birds' eggs, insects attacking dried bird and animal skins, insects, or other dried animal or plant substances. Charles Waterton preserved all his animals in this way. For a permanency camphor will keep insects away. —*C. O. G. Napier, F.G.S.*

Herbarium Insect (p. 45, vol. iv.) — My herbarium, having been once infested by this insect, I have, for the last eight years, applied the following solution (with a camel's-hair brush) to all my specimens, and have not seen an insect since:— bichloride of mercury, 32 grns., rectified spirits of wine, 8 oz., camphor, 5 grns. It requires care in using, as it is a *violent poison*.—*S. M. P.*

Hanging Plants.—I too have observed that many plants have the under surfaces of their leaves of a purple hue; but it is not, I think, confined to the under surface, or to plants exhibiting a climbing or hanging tendency. The Privet (*Ligustrum vulgare*) very commonly has the whole of its leaves of a dusky purple; many species of *Trifolium* also, and some maritime plants, more particularly those of the genera Sueda, Salicornia, or Atriplex. I cannot account for the circumstance, unless it is due to a chemical change taking place in the chlorophyle or colouring matter of the leaves; but I hardly think any *one* theory will account for it. Chemical change is propably the reason that such plants as *Sueda maritima* turn reddish-purple, because it always seems to occur (in common with some other plants) at one particular period, and invariably just before its final decay; but we must, I imagine, account for the abnormal colour in some other way, in such plants as *Linaria cymbalaria*, or the Copper Beech. I believe the question has been mooted before, but I think not answered with any degree of certainty as yet.—*G. T. N.*

Artificial Sandstone.—Under the ruins of Sandown Castle, Deal, is what at first appears to be a soft yellow sandstone; but is only the sea-sand petrified by the lime washed down by the rain; it extends nowhere beyond the castle, and is full of common shells.—*H. C. L.*

Hedgehogs.—These animals are certainly omnivorous; I cannot therefore agree with Mr. W. I. Sterland (p. 23) in "very much questioning whether they would eat apples and pears." They may possibly prefer animal to vegetable food; for I have frequently, when a lad, caught them in traps set for vermin and baited with garbage; also at the mouths of rabbit burrows, which I imagine they were entering with no peaceful intent; nevertheless, they are beyond question vegetable feeders also. In the instance to which Mr. "S." refers—that of a hedgehog carrying off a number of pears by rolling itself on them, and which I transferred to the pages of Science-Gossip from a German periodical, the narrator states that he actually witnessed the occurrence. This, coming from an anonymous correspondent, must be taken only for what it is worth; but then the writer states besides that he saw several little ones in the hedge which enclosed the garden awaiting the coming of their prickly parent. Now, I think it very probable that the hedgehog may in its infancy live exclusively on roots, fruit, &c. If this is conceded, the story is easy of explanation. The matronly robber collects the pears, not for her own eating, but for the support of her progeny. Whether she can herself remove the fruit from her back by a vigorous shake, or by passing her body under the stiff branchlets on the lower part of a hedge, I cannot tell. But I have no doubt the task of detaching it is easily accomplished by the teeth and claws of half a dozen hungry young hedge-pigs; for, after all, the dorsal spines are very short, and would scarcely enter the pear beyond its rind.—*W. W. Spicer, Clifton.*

Wooden Taps and Acari (p. 41).—It is scarcely, I imagine, worth any one's while procuring Wedgwood's ware taps for the sake of avoiding acari. We devour abundance of them (I mean, *Acarus sacchari*) with the brown sugar used in the making of tarts, &c. Let any one dissolve a little brown sugar in a wine-glass of water, and, with the aid of a lens, or even with the naked eye, he will probably see plenty of them struggling on the surface of the water.—*W. W. S.*

The Madrona of California.—There is a tree in California which a friend of mine, who has been there for several years, tells me is called the Madroña by some people, and by others the Chittimwood; but his description of it does not quite correspond with the appearance of the *Arbutus unedo.* He says the Californian "Madroña" is a species of Rhododendron (the Arbutus and Rhododendron both belong to the same order of plants, do they not?) and that the berries are a *pale* red, very abundant in autumn, but quickly eaten off by the birds. The leaves are green all the winter, and closely resemble those of the laurel of the Alleghanies. Surely the berries of the *Arbutus unedo* would be called a *deep red.* The most magnificent *trees* I have ever seen of the Arbutus kind, are some of the *Arbutus unedo* growing on a high hill overlooking the sea at Killymaensewyd (the residence of S. Hughes Rees, Esq.), in South Wales.—*Helen E. Watney.*

Frog Spawn.—When taking a "constitutional" this morning (Feb. 9th), I noticed a quantity of frog-spawn in a running stream; this is earlier than I have ever before seen it. Gilbert White in his "History of Selborne," mentions the 28th of February as the earliest date of its appearance.—*C. S. B. G.*

VIPER POISON FATAL.—*Land and Water* of the 1st of February contains an account of a well-authenticated case, where the bite of a viper proved fatal to a youth in the course of a few hours. The instance is kindly cited in reply to a question which I had put in that journal on the subject, and as the gentleman who cites it is a well-known naturalist, and recognized authority on all points connected with zoology, I rest satisfied that such things have been, and shall, despite your humane correspondent's "plea for vipers," always keep at a very respectful distance from the reptiles.—*Helen E. Watney.*

HELIX CARTHUSIANA (Gibbs's Snail).—I have found this snail plentifully on the sand-dunes north of Deal; both the books I have on the subject state that it is confined to the chalk. Is this an exceptional case?—*H. C. L.*

ALAS, POOR OTTERS!—What extraordinary propensity is it that impels all gamekeepers, and a good many so-called naturalists, *lovers* of nature, instantaneously to slaughter any rare animal they may come across? What strange fate is it that hangs over certain animals, dooming them to destruction? After a time, when all are gone, their ruthless destroyers store up and gloat over the poor dead dried remains of them,—lifeless caricatures at the best of what has been. Can any one believe that a true zoologist, a student of things *living*, would regard the stuffed bodies of the unhappy otters whose untimely death is reported in the last number of SCIENCE-GOSSIP, with any other feelings than those of sorrow and disgust? Alas, poor otters! Peace be to their ashes!—*T. G. P.*

"INSECTS NEVER GROW."—I find it stated, in large type, at p. 70 of Wood's "Common Objects of the Country," that "insects never grow," and that "when an insect has once attained a winged state, it never gets any larger." The statements of writers who write popular science for "the masses" ought always to be received with caution. I should be very glad if any of your correspondents who are learned in these matters would inform me whether the statement that "insects never grow," though undoubtedly true of a great many, is capable of universal application. From my own observations, I believe that flies, as well as locusts and grasshoppers, do grow.—*F. M. N.*

NEW ZEALAND LAUREL.—It is the *Corynocarpus lævigatus*, and is thus mentioned in the "Treasury of Botany." The tree, according to Dr. Bennet, is valued in New Zealand for the sake of its fruit and seeds; the former is of the size of a plum, pulpy in the interior, and sweet. The seeds are used in times of scarcity, and contain a tasteless farinaceous substance. The raw seeds, however, are poisonous, and produce spasmodic pains, giddiness, and partial paralysis; to obviate which effects, they are steamed for twenty-four hours, and then either buried in the ground, or allowed to soak in water for some days. —*George Newlyn.*

NEW ZEALAND GREENSTONE.—There are few people in England who have heard of this singular and valuable stone, and fewer still who know its value in the New Zealand islands. During my stay in Auckland, I was fortunate enough to obtain three or four pieces, one of which, only two inches long, I sold to a friend for twenty-five shillings. For another polished bit, I have been offered three pounds, more than once. There are three or four kinds of it: one a dark green opaque stone, another lighter and transparent, a third mottled. The Maoris cut and polish these after a fashion, about two or more inches long, sometimes much longer, and bore a hole through at one end, in which they tie a piece of ribbon and thus fasten it to the ear. Generally, nothing will induce them to dispose of these. I have often seen five pounds offered for a bit of stone, and always refused. They are often obtained from them when they are intoxicated; and then it is a dangerous bargain, for when they have come to their senses, they will hunt in every corner till you are found. Our troops, during the late war, have taken a number of these greenstones from the natives. I am told, on good authority, that when a soldier kills or takes a Maori prisoner, the first thing is to rip the stone out of the poor fellow's ear. The stone is so exceedingly hard, that it is used by the Maoris for chisels, hammers, weapons of warfare, &c. I think our jewellers would find it a useful stone for rings, pins, &c. Just before leaving New Zealand, I saw a large block of this, which was supposed to be worth £4,000 or £5,000. —*J. E. M.*

A HYBRID PHEASANT.—Can any of our readers inform me whether the nature of the bird described under the above title in White's "Selborne," has ever been satisfactorily determined? Is it, as Markwick suggests, a hen pheasant assuming the male garb after ceasing to breed, or is it really a hybrid? "The shape, air, and habit of the bird," says White, "and the scarlet ring round the eyes, agreed well with the appearance of the cock pheasant; but then the head and neck, and breast and belly, were of a glossy black; and though it weighed three pounds three ounces and a half, the weight of a full-grown cock pheasant (hen pheasants usually weigh two pounds ten ounces), yet there were no signs of any spurs on the legs. . . . The legs and feet were naked of feathers. In the tail were no long bending feathers, such as cock pheasants usually have. The tail was much shorter than the tail of a hen pheasant, and blunt and square at the end. The back, wing-feathers, and tail were all of a pale russet curiously streaked, somewhat like the upper parts of a hen partridge. It ought to be mentioned that some good judges have imagined this bird to have been a stray grouse or blackcock." The coloured plate which is given has certainly more the appearance of black game, but the legs resemble those of a pheasant. I have little doubt that Markwick's suggestion is the true explanation; but should be glad to know if any of your readers can throw additional light on the subject.—*L.*

WATER CRESSES.—Has your correspondent, "Mr. Mansel," noticed the colour of the flower borne by the *Nasturtium Siifolium*? The water cress (*Nasturtium officinalis*) has a white flower. I believe the other three species, natives of this country, bear yellow blossoms, and are very distinct in habit from the *N. officinalis*. I think we are indebted to Mr. Mansel for discovering, in Dorsetshire, a rare species of snowflake, which botanists had previously imagined to be foreign. I remember reading or hearing much about it at the time.—*Helen E. Watney.*

NOVEMBER STORMS.—Your correspondent (B., Melle) should read Lecture IV. on "The Weather and Weather Prophets," in "Familiar Lectures on Scientific Subjects" (1867), by Sir J. Herschel.—*H. Hicks.*

Hybernation of the Toad (*Bufo vulgaris*).—Can any of the readers of Science-Gossip give satisfactory evidence respecting the hybernation of this reptile. I have been an observer of nature for many years, but I have not satisfied my mind respecting the whereabouts of the Toad during the winter months. I am aware some persons say it secretes itself under stones, others in cellars, and some suppose they descend to the mud of ponds, when they hybernate. Now I have inquired of persons whose occupation during the winter seasons is to clean out the mud from such places, but have not succeeded in any one instance in proving that they lie torpid in the mud at the bottom of lakes, ditches, &c., nor has a single toad been seen. I have occasionally found one under stones; but where do the great number go during the winter? Strange tales have been told concerning this reptile and its hybernating. I should be glad to find any of your readers able to enlighten my darkness on this point.—*F. F., Needham Market.*

Crickets.—Take a little oatmeal and sprinkle it upon some pieces of paper for two nights, then remove it for one night, and before putting it down again, mix a small quantity of arsenic well with it; the crickets will eat of this mixture freely, and soon disappear.—*James Banner, in "Gardener's Chron."*

Plants Grown in Carmine.—In Beale's "How to Work with the Microscope," he says, page 108, "Lord Osborne stained tissues of plants in a carmine solution, by allowing them to grow in the same." Is the solution only made with water and carmine, and what proportion of carmine to colour it? Perhaps some of your readers may be able to assist me.—*J. E. T.*

Animalcule.—During the spring-time of the last two or three years I have occasionally and sparingly met with a little ciliated animalcule (I have taken it from ditches), whose name I am desirous of knowing. When magnified about two hundred diameters, it appears about the size and shape of an almond; but its colour is a beautiful pink, the cilia also are very distinct. It is altogether the most beautiful (in my opinion) of the ciliated animalcules I have yet seen. I think it must belong to the Stentor family. A few months back I had access to the Micrographic Dictionary and Pritchard's "Infusoria," and looked carefully through the plates therein, but failed to identify it—*F. G. P.*

Wasp's Nest and Glowworms.—I enclose a portion of nest of the common wasp which was recently dug out of a bank of earth in this neighbourhood (Hollington). I was present at the time, and was somewhat surprised to find nearly the whole of the comb destroyed. On examining the bottom of the nest, I found a great number of the female glowworm, alive and very active. I at once secured some, and placed them under a glass, with portions of comb; but by accident they were knocked over and lost. While in durance they were not at all shy, for they not only devoured the delicate sides of cells, but commenced the thick base as well. I watched the insects myself several times, with others with me.—Is this habit of the female glowworm generally known? I am thoroughly convinced that her ladyship can at any time during the winter months be found feeding upon the wood snail, and one thing I have particularly noticed is that never more than one individual is found in a shell.—*H. Morgan, Beauport.*

Vegetable Autographs.—Under this title, Sir John Herschel has communicated to the *People's Magazine* an account of a somewhat singular process for obtaining correct impressions of the caps and gills of the larger fungi—organisms which, as every botanist knows, are exceedingly difficult to preserve in a satisfactory manner. The essential features of the plan are as follows:—The fungi are to be gathered when first about to shed their spores; the stem is to be detached cleanly with a sharp penknife, and the cap then laid, gills downwards, on a square of clean window glass, previously cut to a suitable size; a tumbler or basin is then inverted over the specimen, which is allowed to remain undisturbed for about twenty-four hours. "In this interval, the fungus being ripe, the spores will be shed; and, falling vertically, each will take its place on, and being somewhat glutinous, will adhere to the glass." The fungus can then be removed, without touching with the fingers, by the help of a couple of pins, "leaving an exact and most beautifully delicate picture of the underside of the plant." To protect this natural drawing traced by the spores, apply another square of glass of equal size to the original square, and unite them by a little melted sealing-wax inserted between them at the four corners. A little gum-water along the unsealed portions of the edges will effectually secure the specimen from dust. Will some of the fungological readers of Science-Gossip give their opinions of the above process?—*W. H. G.*

[We have for many years followed a similar plan of throwing down the spores of Agarics upon black paper. Except for the colour of the spores, and, perhaps, the distance apart of the gills, the method is of no scientific use. The slightest movement or pressure of one glass upon the other, would destroy the sharpness of the figure, unless sufficient time elapses for the spores to become quite dry before it is applied.—Ed.]

Smell of Oak Egger Moth.—I have also observed that the recently evolved insect has a strong and peculiar smell, but should like to know if this is an equal degree in both sexes. One year I had many virgin females, some of which laid fertile eggs.—*C. O. G. Napier, F.G.S.*

Canadian Cotton.—Science-Gossip (p. 29) gives an extract of a Canadian newspaper referring to Canadian cotton. Might this not be the *Asclepias cornuta*? Samples of this down were seen in the Canadian Court at the last Paris Exhibition, but they are, I believe, too short of staple to be employed for weaving. American papers spoke also, some time ago, of the Okra plant, which was said to yield a very good and abundant material for paper making; I do not know which special plant they allude to, but I can say many plants of the mallow order have okra, ochro, ochroë, in their vernacular names; ochro, in British Guyana, West Indies, &c., is the Hibiscus esculentus; a wild ochro of the Antillas is Malachra capitata; another, Tumby ochro, a species of Urena; Bun-okra of Burmah is Urena lobata and multifida, &c. All those plants afford fibres applicable, I believe, to paper manufacturing.—*B. Melle.*

Gum Tabanuco.—Having lately received from Porto Rico a small sample of this gum, which is employed there when coal fails for making gas, I found it to be the same as the "Résine de Gommier," or gum of Bursera gummifera of Dominica.—*B. Melle.*

NOTICES TO CORRESPONDENTS.

W. B. Towey.—Are you really ignorant of what Diatoms are? then consult our first volume, p. 27, "Diatoms: what they are."

W. S., *Rosemary Lane, Whitehaven.*—Why did you not furnish an address to your exchange notice sufficiently explicit for letters to reach you? We can send you half a dozen returned envelopes.

G. T. N.—We must insist upon using at least the initials of our correspondents to their communications, or how can we possibly identify them hereafter?

F. M. B.—It is *Pupa muscorum* (young).

C. P. C.—See Science-Gossip for 1866, p. 228, fig. 217. If our correspondents read their Gossip more carefully, they would not continue to send us "oak spangles" to be named.

R. J. C. will find the information he requires in "The Microscope," by Dr. Carpenter, price 12s. 6d. (Churchill), or perhaps sufficient in "Hogg's History of the Microscope," price 7s. 6d. (Routledge).

E. T. S. confounds together in a most extraordinary manner several species of *Acari*, and calls them all cheese mites. We have had enough of negroes and the "unity of mankind."

G. A. W.—For mounting, obtain "Davies on Preserving and Mounting Objects," price, 2s. 6d. (Hardwicke). For naming or identifying, no general work surpasses "The Micrographical Dictionary," 45s. (Van Voorst).

J. E. M.—No one would undertake the naming of your insects, unless you have duplicates to offer for the labour.

E. T.—Put them in an ants' nest, and the work will be done for you.

W. E.—Probably *Tabanus bovinus.*

J. A. K.—1. Hypnum (Eurhynchium) prælongum. 2. Aneura pinnatifida. 3. Trichostomum tophaceum.—*R. B.*

J. B. L.—1. Hypnum crassinervium. 2. Hypnum flagellare.—*R. B.*

R. G.—1. Hypnum (Eurhynchium) Swartzii. 2. Hypnum riparium. 3. Hypnum (Brachythecium) rutabulum.—*R. B.*

W. E.—1. Hypnum (Eurhynchium) prælongum. 2. Hypnum cupressiforme, var. longirostrum. 3. Hypnum (Brachythecium) rutabulum. 4. Frullania dilatata.—*R. B.*

T. I. W.—"Carpenter's Zoology," 2 vols. nine or ten shillings. Address the other question to the *Lancet* or *Medical Times.*

H. J. H.—"Expository Lexicon of the Terms, Ancient and Modern, in Medical and General Science," by R. G. Mayne, M.D. Thick 8vo., 45s. (Churchill). "Dictionary of Natural History Terms, with their Derivations," by David H. M'Nicoll, M.D. Small 8vo., 12s. (Reeve & Co.) Both give the derivations.

R. S.—You can obtain specimen of *Euplectella* of Mr. W. Cutter, 35, Great Russell Street, Bloomsbury.

W. F. H.—Several notes on drying plants are scattered through our volumes. Collected information on forming a herbarium will be found in a chapter of "A Fern Book for Everybody" (Warne and Co.)

Silex will find what he requires in "Beach Rambles in Search of Seaside Pebbles, &c.," by J. G. Francis, with illustrations, price five shillings (Routledge). See also article by John Ruskin, Esq., in *Geological Magazine* for January.—G. S. T.

J. G.—"Jenner's Flora of Tunbridge Wells," 7s. 6d., published by J. Colbran, Tunbridge Wells.

W. J. G.—The Quarterly Magazine of the High Wycombe Natural History Society is sixpence per number, and may be had in London of Whittaker & Co.

W. E. S.—An article on the subject of British Beetles will appear in our next by E. C. Rye, Esq., author of "British Beetles," &c. (Reeve & Co.)

B. T.—In the quill *Achorutes aquaticus*, one of the Poduræ.

J. E. M.—Your beautiful water weed is a *Batrachospermum.*

A. D. M.—For details of the Spectroscope, see an article by H. C. Sorby in *Popular Science Review*, January, 1866.

J. C.—The seaweed is *Gymnogongrus plicatus.*—*J. E. G.*

W. R. H.—A modification of an ordinary small microscope would answer your purpose, with a large tube and large eyepiece. This would only cost a few shillings additional.

Spider.—Again we repeat that we cannot answer anonymous correspondents.

J. R. B.—For moths and butterflies, "Stainton's Manual," (Van Voorst). 2 vols., 12s. For spiders, "Staveley's British Spiders" (Reeve & Co.), 10s. We know of no others worthy of recommendation.

B. (Melle).—No nuts enclosed upon receipt.

Ivy again.—We cannot insert other and merely corroborative notices of what has already appeared, especially as several have reached us this month. However, those correspondents will please to accept our thanks.

H. M.—The Brimstone Butterfly is sometimes seen whilst the snow is on the ground.

A. S. had better send her query to Mr. Newlyn.

W. E. P.—Yours is not a Bat hair, but probably that of some Rodent. We have no unmounted Bat's hair.

J. G.—Your Peziza belongs to the section *Humaria*, but as the spores are not developed it cannot be safely determined.

F. W.—*Mnium undulatum.*

R. H. K.—It is the Fairy Shrimp (*Cheirocephalus diaphanus*). See Baird's "British Entomostraca." (Ray Society.)

M. G.—Native. See Science Gossip for 1866, p. 181.

B. T.—The creatures found in Balanus are the larvæ of some species of two-winged fly belonging to the great family Muscadæ. The animal of the Balanus must have been in a dead or decaying state.—*I. O. W.*

EXCHANGES.

Mosses.—Hypnum pumilum, histricosum, or illecebrum, for other good northern species.—E. Capron, Shere.

Mosses.—*Anæctangium compactum*, for other good species.—J. Bowman, Cockan Lamplugh, Cockermouth.

Diatoms.—Pleurosigma strigosum, quadratum, angulatum, formosum, hippocampus, balticum, and Actinocyclus Ralfsi, and other marine Diatoms from rich gatherings (mounted) for other good mounted objects.—T. R., 100, Queen Street, Portsea.

Fossil Diatoms (mounted) from Little Falls, New York, for other good objects.—W. Freeman, 2, Ravensbourne Hill, Lewisham Road, Greenwich.

Scarlet Tiger (*Hypercampa dominula*) offered for *Arctia villica* or any of the Clearwings.—F. Alderson, Hilden Hill, Tonbridge, Kent.

Elementary Vegetable Tissues (mounted) wanted for other good slides.—W. F. H., Stamp Office, Fordingbridge.

Good British Lepidoptera for exchange.—C. R. Doward, 41, Copenhagen Street, Worcester.

Mosses.—*Atrichum laxifolium* and *Dicranodontium longirostre*, for stamp and address.—John Whitehead, 17, Shaw Street, Dukinfield, Cheshire.

Sections of Ostrich's Egg in exchange for other objects.—W. H. R., 12, Bonaccord Lane, Aberdeen.

Wanted in exchange, or by purchase, Eupodiscus Rogersii, Glyphodiscus stellatus, Brightwellia elaborata, B. Johnsonii, B. coronata, and Heterodictyon splendidum. — Address, Rev. J. Bramhall, St. John's Vicarage, King's Lynn.

Northern Shells for other Northern species.—O. A. L., Mörch, Frederiksborggade, 7, Copenhagen.

Californian Shells for British or Northern species.—R. E. C. Stearns, Vice-President, California Academy of Sciences, 622, Clay Street, San Francisco; or to R. Brown, 4, Gladstone Terrace, Hope Park, Edinburgh.

Ligamentum nuchæ Giraffe (mounted) for other good mounted objects.—W. E. Porter, Mary Street, Balsall Heath, Birmingham.

Insects' Eggs (named) wanted for rearing. British seeds for microscope offered in exchange.—W. H. G., Vernon Cottage, Thornhill Road, N.

BOOKS RECEIVED.

"Wholesome Fare; or, The Doctor and the Cook," by Edmund S. and Ellen J. Delamere. London: Lockwood & Co.

"The Naturalist's Circular." No. 21. February, 1868. London: Henry Hall.

"Proceedings of the Bristol Naturalist's Society." Vol. III. No. 1, January, 1868. Bristol.

"Hooper & Co.'s General Catalogue for 1868. London: Hooper & Co., Covent Garden.

"A Plain and Easy Account of the British Fungi," by M. C. Cooke. Second and Revised Edition. London: Hardwicke.

"An Improved Method of dividing Alcohol and other Thermometers," by William Ackland. From the Proceedings of the Meteorological Society.

"Guinea Worm, or Dracunculus, its Symptoms and Progress, Causes, Pathological Anatomy, Results, and Radical Cure," by James A. B. Horton, M.D. London: Churchill & Sons.

"Country Life." Nos. 25, 26, 27, 28. London: Bolt Court.

"The American Naturalist. No. 11, January, 1868. Essex Institute, Salem.

Communications:—W. B.—W. A.—M. G. F.—J. W. G.—H. F. H.—H. H. P.—E. G.—G. S. P.—J. H. M.—G. T. N.—T. W. W.—S. C. F. Co.—N. S.—J. E. T.—W. R. H.—C. O. G. N.—H. C. R.—J. B.—F. F.—T. G. P.—J. W.—E. W.—R. C. B.—F. B.—R. B. S.—R. J. C.—T. B.—F. M. N.—H. C. L.—A. H. T.—F. M. (No enclosure received).—B. C.—E. T. S.—H. E. W.—E. T.—J. E. M.—J. W., jun.—J. A. K.—L. N.—G. A. W.—J. M. H.—C. P. C.—J. B.—P. M.—M. G.—R. B.—M. H.—G. J. E.—W. E.—A. E. M.—J. B. L.—S. P.—H. J. H.—B.—H. H.—C. R. (Yes).—C. S. B. G.—T. R.—J. C.—F. A. R.—H. T.—W. F. H.—F. G. P.—F. A.—J. G. F.—G. S. T.—H. W. B.—C. H. B.—J. G.—B. T.—W. J. G.—W. E. S.—W. F.—R. B. S.—C. R.—E. C. R.—H. M.—F. S.—G. W.—R. H. U. B.—J. B.—G. S.—J. G.—B. (Melle).—J. W.—C. R. D.—J. R. B.—C. A.—J. M. H.—J. R. B.—C. R.—G. W.—J. B (Lynn).—G. S.—F. S.—H. M.—J. B. W.—W. E. P.—B. (Melle).—W. H. R.—J. A.—R. H. K.—W. E. P.—M. G.—F. W.—J. M. D.

ON COLLECTING AND MOUNTING COLEOPTERA.

By E. C. RYE.

THE present space at my disposal being necessarily limited, I can only indicate the habits and haunts of our Coleopterous Fauna in a very superficial way; and, unfortunately, it is precisely in the case of this order of insects, both on account of its numerical extent (containing as it does upwards of 3,000 recorded species in the British Isles), and the very varied and mostly light-shunning proclivities of its members, that a considerable amount of specific knowledge on those points is required before the collector can expect to be at all successful. Moreover, it is of the greatest importance that the student should be enabled to detect his captures specifically at the time; which to do requires acute vision and a good memory—a combination not developed in all men. It is to these considerations that I attribute the paucity of rare or new species among the beetles that occur to beginners. Luckily, however, the field of observation is so large, the structural details of the species so varied, and (as yet) their preliminary stages so little known, that there is more than room for all.

Looking at the British Isles in a Coleopterous point of view, it may be remarked that Ireland is the least worked, and should, for various reasons (especially the set of the Gulf stream on its southern coasts), be most likely to produce novelties. The boundary counties of Wales are also promising and comparatively virgin hunting-grounds. In certain parts of Scotland (especially towards the west) an unexpected development of Alpine and Swedish forms occurs; and Scotland itself, as a whole, is much more productive, both of species (whether recorded or new) and individuals, than the dweller in the Midland Counties would expect. The neighbourhood of London, both on account of its geographical position and its command of varied soils, through the numerous railroads of which it is the centre, is perhaps the best of any district, judging from results, which, however, may be fallacious, the numerous captures of good things in its vicinity being possibly due to the number of resident entomologists. Anyhow, it is beyond doubt that beetles are to be found nearly everywhere; though it is also still more so that a chalky or sandy soil (or, still better, the point of junction of chalk and sand) is the most, and a clayey soil the least, productive. Nevertheless, fenny districts (wherever such now remain undrained) are exceedingly prolific in beetle life, the *Hydradephaga* being of course proportionately predominant.

As instructions for collecting, the method at once most exhaustive and most likely to be efficacious would be to go through our list of *Coleoptera*, pointing out localities for the different families or minor subdivisions of them; but want of space prevents me from adopting such a course, and I can only throw out general hints for the use of the beginner.

First, then, it may be remarked that the prevailing notion as to the abundance of insects, and therefore of beetles, in the hot summer months is scarcely a correct one. For the most part, beetles attain the last stage of their metamorphosis at the latter end of the autumn, passing the winter without leaving their hiding-places, and coming into outer light with the first warmth of spring. Many, also, which come to maturity during the earlier autumn hybernate in all kinds of nooks and corners, appearing also again in the ensuing spring. The

spring, early summer, and autumnal months are therefore the best for collecting; and the height of summer is not found productive, on account of the survivors of the preceding year having died off, and the prospective generation being either in the larval or pupal condition. Winter, however, will prove a good season for the energetic collector, who then will find in moss, at roots of tufts of grass, under bark, in cracks of trees or the soil, or even deep under the surface, abundance of torpid beetles, if he search in likely places. For this winter work all the implements required are a stout knife and a sheet of brown paper, on which latter moss, grass, or other insect-harbours are to be shaken. Moss is often so productive (whether from tree-trunks or growing on the ground) that it is worth while to take it home in a linen bag, the contents being examined at leisure; in this case it saves time and space if the moss be pulled to pieces at once over a coarse wire sieve (which, with canvas sides, and either simple or folding for the pocket, can be obtained at Mr. Brewer's, 55, Great Russell Street, opposite the British Museum, and is almost indispensable for small insects), the insect contents and small fragments only being then taken home. It stands to reason that isolated tufts of grass, and places where moss is not very abundant, will be found most productive; for, where there is an abundance of cover, insects are widely spread, and where there is but little, they congregate in numbers. Tufts should be cut just below the soil, and pulled to pieces over the paper. A common garden pruning or clasp knife is good, but an old sharp dinner knife (to be carried in a sheath) is still better. A yard or so of double india-rubber cloth makes an excellent kneeling pad for use in marshy places; and, if faced with white or grey, is good for shaking tufts on also.

For general purposes the spring and early summer will be found the best times in which to collect. The most careless observer can scarcely have failed to notice the myriads of beetles, of all kinds and sizes, that, waking from their long rest, gambol about in the air, and settle or run on the paths, even in our cities, when the first hot rays of the sun in April or May seem to arouse all nature to enjoyment of life. Then is the time for the novice to lay in his first stock of material; whether he travel to the coast, where the sand-hills teem with beetle life (those at Deal are the best, and easily and cheaply accessible), or seek the nearest wood, plantation, fields, or common. Scarcely any implements are required, the hand alone being almost sufficient; but a small and light gauze bag-net, such as is employed by butterfly hunters, will at this time be found very useful in entrapping the numerous winged Coleopterous atoms that cross and recross the path of the collector in rapid flight. Such a net, however, will be of little avail at other times, as there are none of our beetles sufficiently active on the wing to require its aid, save the *Cicindelidæ*, or Tiger-beetles, which run and fly alternately (like partridges) in the hot sunshine about sandy places; and none of these but *C. campestris*, abundant in most parts of the kingdom, are likely to be met with often. This light net can, perhaps, also be used with advantage by waving it about at sunset in the summer over heaps of cut grass, dead sticks, or manure, to which many small and rare species fly just before dusk. These despised heaps of garden and other refuse act as first-rate traps for beetles; and any collector living at the shortest distance from the metropolis (or even in it) will do well to keep a little heap of leaves, twigs, rotten wood, grass, and such odds and ends, in which he will constantly find many beetles. Wide-mouthed bottles sunk in the ground, and baited with a piece of dry meat or small bone, are often attractive; but the dry carcase of any small animal, whether nailed up or left on the ground, will be better still. Of course, if the collecter can in his rambles find a barn-door covered with feathered robbers, or a keeper's tree, its boughs laden with cats, weasels, &c., great will be his reward in *Necrophaga*, *Nitidulidæ*, *Necrobiæ*, *Brachelytra*, &c. These he will obtain by holding an umbrella or beating-net beneath, and administering the bastinado to them with a stick. This beating-net (which may also be used for sweeping) is absolutely necessary to the Coleopterist, and may therefore be described at once. It consists of a stout stick, to the ferule of which is attached on each side, by a strong hinge, a strip of flat steel or whalebone; these strips are united at their extremity near the handle of the stick, and fixed into a brass ring that plays up and down, and when pushed forward and caught by an umbrella spring half way down the stick, forms a stout circular frame. To this is appended a net of strong but fine canvas or coarse linen, the rim being well bound with leather cloth, to lessen the effect of friction. The whole, when folded up, resembles a large umbrella, being thrust into the usual glazed cover, and is very portable. Such a net is to be obtained at Cooke's, New Oxford Street, near Mudie's Library, and can be used for sweeping herbage, beating into, or any other operation of collecting. A smaller net, for sweeping only, will be found of great assistance: this can be made of stout iron wire, circular in shape, and either stiff or folding (and if so, in one or three places), to go into the pocket; and one end of it should be forged flat, with a hole drilled through it to admit the other end, which must be wormed, and screw into a long ferule fastened on a stick. In a short time, however, the screw will cease to bite firmly; so I find it best to drill a hole at once through the ferule and screw, inserting a moveable metal pin transversely, which prevents the net turning round, and probably all

the contents being lost. To this wire a net of similar stuff and binding to the sweeping net must be fitted, and can easily be made so as to slip on and off. A similar net, of stouter wire, larger dimensions, and wider-meshed canvas, and fastened to a much longer and stronger stick, can be made for water-beetles; and it will be found efficacious then to fasten the canvas to the frame with small wire rings.

The insects, when caught, must be conveyed home in a collecting bottle, of which it is best to be always provided with two; it is usual also to provide one's self with divers small strong glass test-tubes, fitted with corks, for special captures. The ordinary collecting bottle should be of strong clear glass, with a wide mouth, lipped (so that it can be attached by string to the coat), and flat-bottomed; it need not exceed three inches in length, and if covered with white paper on one side will be less likely to get broken,—the paper, moreover, affording a background for the easier examination of its contents when collecting. It must be provided with a stout cork, perforated by a wide quill, which should be level with the cork at its bottom, but must project about an inch and a half at the top, where it may advantageously be cut across diagonally, instead of straight. This quill can be fastened in with sealing-wax at its points of junction with the cork, leaving of course a free passage for the beetles captured. It is stopped up with a long wooden plug, fitting accurately, but easily, and with a knob at the top to allow of its being taken out with the teeth—the hands being often both occupied. The object of the quill is to avoid handling the beetles when captured, as they can be easily bottled through it; if, however, a specimen must be taken by hand, the best way is to touch it with a damp finger and put it on the back of the hand, then bottling it through the quill. A piece of fine muslin or crumpled blotting-paper should be kept in the bottle and tubes, to afford foot-hold, and prevent the contents rattling about. The other bottle above mentioned should be larger, and need have no quill through its cork; indeed, I find the common wooden screw top, fitting outside, is more secure than a cork. It must be about one-third full of young shoots of laurel, bruised and chopped up, which effectually quiet (and, if fresh, kill) almost any beetle. Into it all voracious insects must be put—*e.g.*, all the larger *Geodephaga*, *Hydradephaga*, and *Brachelytra*, the *Telephoridæ*, and many others, whom a sad experience of misplaced confidence, testified by the broken limbs or utter absence of smaller and more precious captures, will soon impress on the young collector's memory.

Having now mentioned the principal instruments required, I can continue my hints as to the haunts of *Coleoptera*; and I may here observe that at the time when insects fly much, in the spring and early summer, as above mentioned, sand-pits, especially if their sides be straightly cut, will be found most excellent traps for very many species, which, when dashing wildly about on the wing, knock against them and fall, stunned, but uninjured, to the bottom. Many species live constantly also in such places such as *Gronops*, some *Bledii*, *Dyschirii*, *Sibynes*, &c. Charlton, Shirley, Weybridge, Hampstead, and Reigate are all good sandy localities near London. At this time, also, beetles may often be seen crawling on wooden palings, especially if they are unpainted, and freshly put up. Sandy places formed by diversions of the currents of rivers, or on the sea-shore, harbour very many beetles, which even occur in places that for a portion of the day are covered by the tide. Some of these come to the surface at sunset, others during the blaze of mid-day, and very many will be found by shaking heaps of seaweed and other tidal refuse on paper, pulling up and shaking plants (especially disturbing the ground at their roots), and examining dead birds, fishes, &c. On chalky parts of the coast, stones should be carefully turned over (this applies also to inland chalky districts, such as Box Hill), as many good *Geodephaga*, *Brachelytra*, *Rhyncophora*, &c., are found in such places. Chalk pits also harbour some few good things, readily to be detected crawling at the bottoms of the sides, and under stones. Stones and logs of wood may always be turned over with possible advantage; and every pebble or boulder on high hills or mountain-tops should be rolled out of position, and the cavity beneath it, and moss (if any) round it, carefully examined.

Assemblages of beetles, of many species and in great numbers, will be often found in refuse at the edges of rivers after floods or unusually high tides, and also on bushes or palings after the prevalence of winds in particular quarters. These, however, are lucky accidents for the collector, and cannot be reckoned on or explained. By shaking and sifting (with the sieve) the damp stuff at the bottoms of haystacks, beetles of numerous species and genera (*Cryptophagus*, *Monotoma*, *Atomaria*, *Latridius* *Heterothops*, *Haploglossa*, *Stilicus*, *Quedius*, &c.) will be found in abundance, and at all times of the year. Dead leaves, especially of the beech, that have dropped in hollows and remain undisturbed until the bottom layers are black and damp, must never be neglected; here the sieve is a *sine quâ non*. Very many good species haunt the sappy exudations of trees (those from oak, elm, and pine being very attractive), and most especially when these are caused or increased by the ravages of the caterpillar of the Goat-moth, the damp frass of which full-flavoured beast appears exceedingly to the taste of certain Coleopterous aristocrats, many of the best *Brachelytra* and *Nitidulidæ* being only obtainable in this way. It may, indeed, be shortly remarked that any diseased part of a tree or plant is almost

sure to be visited by beetles (which in many cases doubtless cause the complaint).

The dwellings of our social *Hymenoptera*—ants, bees, wasps, and hornets—are all especially inhabited by Coleopterous lodgers; indeed, collecting ants'-nest beetles is quite a study of itself. I may remark briefly that where a nest is in a tree, the bark, &c., should be carefully examined, and stones and pieces of wood laid as traps; in other situations the nests can be sifted, stones turned over, and the "runs" of the ants examined. Any attack upon the nests of the other and more warlike insects must be left to the collector's discretion (or valour); in the hornet's nest he may find the giant "Devil's-coach-horse" (*Quedius dilatatus*), which also occurs about *Cossus*-burrows, and should in the latter case be searched for by night, with a lantern.

Trees, standing or felled, and whether in a sound or rotten state, harbour a great many species. To extract beetles from solid wood is no easy task, and requires the most potent tools that can be obtained; a long and strong chisel, however, is handy in many cases. Perhaps the majority of the wood-infesting *Coleoptera* are found in the bark, which should therefore be always very carefully examined, and even broken into fragments where there is reason to suspect a beetle-tenant. *Under* dry or loose bark, also, very many species constantly occur, of flattened habit of body, and usually predaceous; but a considerable number live either on the surface of the solid wood, mining galleries beneath the bark, or drilling their circular holes deep into the trunk. Some also dwell in the topmost twigs, and in the dry stumps whence boughs have been cut or fallen. The best trees for wood-feeders and their parasites are oak, beech, and pine, ash and willow also sometimes being good. The collector must in no case despise old heaps of dead sticks or twigs, whether on the ground or remaining on trees, or thrust into gaps of hedges, since out of them many good things may be beaten; and he must especially look out for fungoid growths on trees, which often harbour a profusion of insects.

In spring and early summer, woods must be visited for beating purposes, the best trees being oak, hazel, and dwarf poplar, and young growth of the second year the most productive—large trees being seldom of much use. "Beating about the bush" is here the most direct way to success, and an umbrella held open beneath the young trees, which must be tapped with a stick, is a most efficient receptacle for the results, being preferred by many to the orthodox net above described. *Longicornes*, *Curculionidæ*, and *Eupoda* of varied forms will repay the collector's toil. I have observed that the best time for beating is just before a storm. Darenth Wood, near Dartford, is one of the best places for the metropolitan Coleopterist for this work. It is of course needless to say that such conspicuous species as frequent wild flowers must be looked after sharply at all times; many of them, however, must be "stalked" with care, as they are often wary in the extreme.

When the time for beating is over, sweeping (always good) may be said to commence; and I can give no better advice than to try all plants and places. Experience alone can here suggest a likely spot for work, and a knowledge of the habits of one species in a genus will often afford a clue whereby its congeners may be found. Grassy banks in sheltered places, water plants, wild plants in hedges, ragged and straggling roadside weeds,—all must be tried. Sweeping beneath trees and in damp meadows towards evening will be often found very remunerative.

"Book" knowledge is also here of great help, in order to search for particular plants, &c., which are known to be frequented by particular species; and many beetles not yet found with us may be discovered by a reference to continental works mentioning their haunts and seasons.

The edges of the banks of ponds and rivers will always be good hunting-grounds; they should be stamped upon or broken away, and any plants pulled up, so as to loosen the soil. Water dashed into the cracks will often bring to light numerous lurkers. The droppings of herbivorous animals must be carefully examined, especially in sandy places, and in the spring and autumn. If near water, they can be broken up and thrown in, when the beetles will appear on the surface. Marshes, heaps of cut reeds, water-plants, &c., harbour myriads of beetles, which also will be found by grubbing up roots and breaking away the edges of the ground near the water. Sugaring by night, as done by Lepidopterists, will produce some nocturnal species, many of which also come to light, like moths.

In the autumn, the various species of fungus then so abundant must be carefully examined, and will be found to contain an enormous number of inhabitants, even the puff-ball having its peculiar denizens.

I have no space to do more than refer to the numerous water-beetles; these occur in running streams and rivers (usually at eddies, or near places where the current is violent), in stagnant ponds and brackish streams, the banks and shores of all of which must be carefully examined for such as are of sub-aquatic habits. Stones in running streams beneath the water often harbour many species; and the net should be carefully drawn round the banks and bottom, and especially among and round water-plants.

Finally, I would recommend all who have the opportunity to endeavour to breed from the earlier stages: to do this they must keep the larvæ or pupæ as nearly as possible in their natural state. Wood with larvæ in it may be brought home easily,

and plants containing larvæ or pupæ in the stems are not difficult to carry away.

To kill the captured insects it is only necessary to immerse them in boiling water for a very short time. They should not be left in it after their death-struggle, but taken out with a camels'-hair brush and placed on blotting-paper to dry. This does not destroy or damage their colour or markings in any way. A good way to get them out of the water rapidly, and without handling them too much, is to make a sort of strainer with a piece of muslin, which is put into the hot water, and into which the captives are then immersed. In this way all can be lifted out at once and placed on the blotting-paper. It is always as well to put the beetles out of the laurel bottle also into the hot water, lest any spark of life should remain. Those that are *killed* with laurel are so stiff that it will be found impossible to set them at once. They should be dried on blotting-paper (merely to drain off the water), and put, with all others which it is not convenient to mount at once, into a muslin bag, which is to go into another tightly corked laurel bottle, retained for relaxing purposes—the effect of a stay in the latter for a few days being that the insects can be most easily manipulated. They may, indeed, remain in it for months, or even over a year, but are in that case liable to go rotten and greasy.

The young and tender topmost shoots of the laurel are best: they should be bruised, stems and all, and cut up into little pieces. If damp when gathered, laurel and beetles will go mouldy.

To mount the specimens, all that is required is good cardboard of fine surface and moderate stoutness, some pins, a setting-needle (made by inserting the point half of a fine needle into a thin paint-brush stick), a fine brush for setting, a larger one (flat red sable is the best) for brushing out the legs, a piece of flat cork to pin the card on, and a bottle of gum-tragacanth. The latter can be obtained at any chemist's, and should be selected of as transparent a nature as possible. A few flakes of the size of the finger nail, with one or two nodules of clear gum-arabic, will make a good-sized bottle full, —the gum not melting, but absorbing water, and swelling into a milky mucilage, which should be of even quality, and so thick as not to flow readily. Only a little need be made at a time, and a drop or two of carbolic acid will prevent it from turning mouldy. Another brush should be specially retained for the gum-bottle, and a little clean water always at hand when specimens are to be mounted. The readiest way is to take a strip of card rather deeper than the insect to be set, pin it on the cork, and put some of the gum on the space the insect is to occupy: the specimen (which has been turned on its back in order that its legs and antennæ might be brushed out) is then put on the gum, and arranged with the setting-needle and fine brush, care being taken not to gum the upper surface. A pocket glass of moderately low power will usually be needed for the more exact performance of this operation. Perhaps the best direction for the limbs is as follows: the palpi straight forward; the antennæ sloped on each side straight, at an angle of about 45 degrees; the front legs forward, parallel with the antennæ, and the middle and hinder legs parallel to each other, and rather directed backwards; but the limbs should not be straggled out unnaturally, nor the different segments of the body unduly separated or distorted, the main object being to get the body strictly level and straight, and to display the limbs (and where practicable the mouth-organs), so that they can be readily examined with a higher power when necessary. Many specimens can be mounted side by side on the same strip of card, leaving a gap between each; or, if preferred, each specimen can be mounted on its separate card. All superfluous gum must be washed off the card (which it is sometimes desirable to damp on the lower side, to prevent curling), and when dry, which will be in a week or fortnight, according to the weather, the specimens can, if set in a row, be cut up separately and evenly the card being trimmed away close, and straight in front and at the sides, but leaving a moderate space behind, through which the pin is to be pierced. Insects of the same species will, of course, have their cards afterwards cut to exactly the same length. When a specimen is refractory, it should be left to dry on the gum, and in a quarter of an hour or so it can be easily treated by damping and pulling into position one leg, or all the limbs on one side, at a time. A small pair of forceps, such as are used with the microscope, is very useful for this purpose. Stubborn limbs can also be held down with small card braces on pins until the gum has dried. The *Brachelytra* require very careful setting, as their long, flexible, and uncovered abdomens run up in drying. To avoid this, it is best to insert the point of a fine needle into the extremity of the abdomen, and pull out all the segments to their utmost; this breaks away the "intercostal" muscles, if I may so pervert that adjective, and the abdomen can then be put back to its proper length without much fear of shortening. A very fine setting-needle for this purpose is obtained by putting a sealingwax handle to a "bead-needle." An extra application of gum to the tail is also useful here. Specimens of both sexes of each species will be, of course, mounted on their backs, to show the under side. Large beetles (the word *large* being construed according to individual fancy) must be pinned straightly through the right wing-case, near the shoulder, avoiding the articulation of the middle legs. Their limbs can be displayed with pins or card-braces on a cork setting-board. If beetles of large size be mounted on card, their bodies should be fastened to it with white liquid glue, obtainable at any oil-shop; their limbs

can be set out with the usual gum. All specimens should be put into a setting-frame, or pinned in an open box, and exposed to fresh air for a week or fortnight, though *Brachelytra* best avoid running up by being first left for a day or so in a closed box. Finally, benzine must be kept to clean specimens from grease, and carbolic acid to destroy mould.

PHANTOM LARVÆ.*

By Dr. Carrington.

EARLY in September, 1867, while netting for microscopic objects in a favourite pond of mine on the Ellesmere estate, near Eccles, I met with a number of larvæ which were new to me. At first I thought I had captured the rare *Cheirocephalus diaphanus*, but on closer inspection it was evident they were the larvæ of some dipterous insect (*Corethra plumicornis*), and until their true name was obtained, they were generally spoken of by us as the Phantom Larvæ.

My acquaintance with entomology is scanty, extending only to dissections of some few genera; but it was impossible to watch these larvæ day after day, and gradually become acquainted with their anomalous structure and strange habits, and not wish others should share the pleasure. I have accordingly made some drawings which at least may claim the merit of accuracy, and shall endeavour, as briefly as possible, to describe those anatomical details which appear to me of most interest.

The characteristics that would strike an observer viewing them for the first time with an ordinary lens are, first, their remarkable transparency; indeed, they are so translucent, that unless you know what to look for, it is difficult to make them out in the water. Their specific gravity also coincides with that of water, so that they are enabled to float near the surface, or bottom of the vessel, without apparent effort. They differ from all larvæ with which I am acquainted by this habit of remaining suspended in mid-water; seldom seeking the surface for purposes of respiration, as in the case of other Diptera. I must not, however, allow you to form the impression that their habits are sluggish and inert. Far from this, their quietude is that of the eagle, for, like that bird, they are watchful, and ready to pounce in a moment on any object moving beneath them. Their spectral appearance, and the mysterious manner in which they vanish and reappear in unexpected places, will explain the name we ventured to apply to them. One habit seemed at first especially "uncanny," the sudden way in which they make a half-turn, like the needle of a magnet; so that if we are examining the head, we find the tail substituted in its place, and before we have time to make out the details—presto! the head as suddenly reappears! Our phantoms are, I fear, not as innocent as phantoms should be. We may rather compare them with vampires which suck the life-blood of unwary victims;—a glance at the cruel armature of the mouth will satisfy you of this fact. I do not allude to the formidable-looking organs which articulate with the snout, and look like the fangs of a viper; these are modified antennæ, and serve the animal to rake up the surface mud in search of prey. Foot-like antennæ are also found in some Entomostraca (*Candonia*), and in *Corophium*

* I was ignorant until after the completion of my paper that the subject had been preoccupied by such competent observers as Mr. E. Ray Lankester (*Popular Science Review*, 1865), and Prof. Rymer Jones (*Microscopical Journal*, Oct., 1867).

Prof. Jones contents himself with a brief but lucid summary of the chief points of interest in the development of the "glass" larva. More fortunate than myself, he has been enabled to describe the wonderful growth of the respiratory system which takes place during the transition to the pupa state. Some of my larvæ are still living after three months' confinement (Feb. 10, 1868), but I have watched in vain for their metamorphosis.

From some points of the professor's description I must dissent. Thus, referring to what I have called the antennæ (fig. 5, *a*), he writes: "In their disposition they remind us of the foot-jaws of the Branchiopod Crustaceans (such as *Cheirocephalus*), and in like manner are equally instruments of progression and weapons for the capture of prey. The anterior pair, articulated to the apex of the snout, are of great strength, and are moved by powerful muscles, distinctly seen through the transparent covering of the head. At their extremities they bear fan-like tufts of stiff setæ, that, when expanded, form powerful oars, the downward strokes of which, when energetically made, have a *marked effect in aiding the progress* of the animal through the water. More frequently, however, their movements are of a gentler character, and only serve to cause the influx of a *constant stream towards the mouth*."

Again, he writes: "The second pair of appendages are composed of numerous narrow laminæ, much resembling in their arrangement the plates of whalebone in a whale's mouth: *and, indeed, they perform a very similar office*," for they "can be spread out like the walls of a tent, so as to enclose as in a net whatever small animals may be brought within their expanse by the intrait current above alluded to." Now it must be admitted the uses and homologies of the oral appendages are most puzzling, but I cannot but suppose, when the above words were written, the professor was trying to reason out the problem on the dead animal rather than the living one, or has mistaken the convulsed motions preceding death for normal acts. How can naturalists expect other than lying responses from creatures undergoing the torture of the compressorium, or sealed up alive in a glass cell? After repeated examinations, I have failed to trace any current, *constant or otherwise*, towards the mouth referrible to the antennæ; nor have I seen them used as oars during progression. The ordinary movements of the larva seem to be due entirely to the anal fan. Each antenna bears four (not six, as in the drawing, *Mic. Journ.*, Vol. xv., Pl. ix. f. 3) slender setæ (not plumed, as in true swimming feet), which are used only in retaining the prey, or forcing it upon the lancets, or in raking up the surface mud. The second pair of appendages, again (fig. 5, *b*), seem to me to be true lancets, and I feel certain I have seen them so applied in piercing the larger Entomostraca, which are then passed on to the powerful jaws.

In the same plate, the fourth appendage (*l. c.*, figs. 3, 4), which seems to me to be single and trowel-shaped, forming an upper lip, is figured with two blades.

longicorne, and other marine crustacea which beat the mud in search of worms. Our larvæ are very pugnacious; they are continually butting at one another, after the manner of rams; and when one commences an assault, the spectators are certain to join in it. No perceptible wounds result from these encounters; but probably in the case of weak individuals the results are more fatal, or how are we to account for the constant decrease in the number of specimens? I am loth to affix the stigma of cannibalism on my favourites, but how shall we escape the inference?

During the two months the larvæ have been in confinement there has been no change into the pupa or imago states. Do they continue through the winter in the larval condition? The vessel containing them is covered with a plate of glass, so that there can be no doubt about it. Indeed, I have been most anxious to trace the succeeding changes, and make acquaintance with the perfect *Corethra plumicornis*.

the base, and then branching into two, four, or even eight processes (fig. 52). Entering the base of one of them, I traced a nerve filament, so that their function may be tactile.

Anal Segment.—Terminating the body we find four small branchial leaflets, above them four plumose bristles, and below, inserted on each side of the rectal opening, two hooked claws (fig. 57, *d, f*). What can be the use of these hooks which point forwards, and curve beneath the segment? Perhaps they are designed to fix the larva before its transformation. Along the midline of the underside of the tail (fig. 57, *g*) is inserted a fan-shaped cluster of bristles, bifurcate at the base, and delicately plumed (fig. 51). This structure, in fact, resembles a feather fan, and serves at the same time as a helm, and powerful scull. It is the motive organ of the larva, and forms a beautiful microscopic object, reminding us of the heterocercal tails of some fish.

Head (fig. 50, *a*).—The head is divided from the thorax by a well-marked constriction. It is com-

Fig. 50.

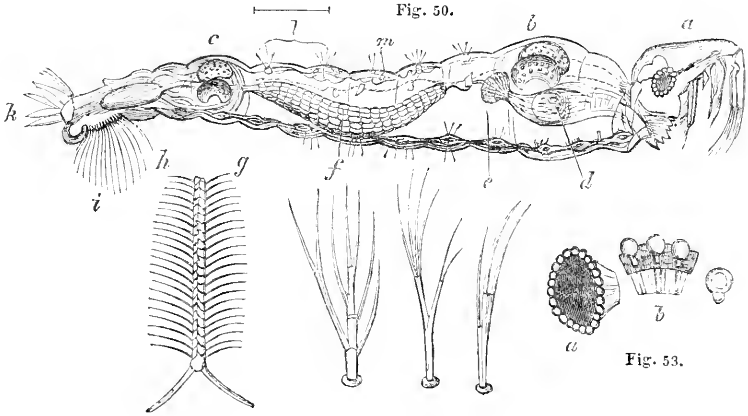


Fig. 53.

Fig. 51. Fig. 52.

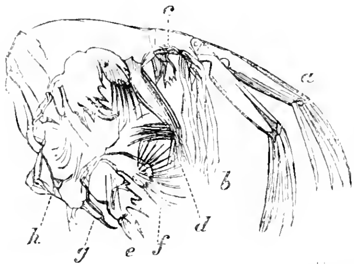
Fig. 50. Corethra plumicornis × slightly. *a*. Head. *b*. Thoracic air-cells. *c*. Abdominal air-cells. *d*. Œsophagus. *e*. Gizzard. *f*. Stomach. *g*. Commencement of intestine and origin of four biliary ducts. *h*. Colon. *i*. Fan-like anal fin. *k*. Four bronchial leaflets. *l*. *m*. Dorsal vessel.
Fig. 51. Lower part of hair from tail fan. Fig. 52. Compound hairs from the body.
Fig. 53. *a*. Eye, × 30. *b*. Single lens, and three detached lenses, showing the way in which they are imbedded in the pigmentary layer; beneath are the fibres of the optic nerve, × 150.

General Characters.—The body is about half an inch long (fig. 50), cylindrical, and gradually tapering to the tail; there are no feet or other appendages, except those attached to the anal segment, which will be described presently. The outline of the body is not straight, but somewhat *ſ*-shaped. The third segment is broadest and most prominent, and contains two air-sacs, which shine like globules of mercury; and again we find it slightly humped at the ninth segment, which in like manner encloses two air-sacs (fig. 50, *b*, *c*). The skin is delicate, perfectly smooth, and pitted over with round translucent dots. On the sides of the segments are scattered compound hairs. These hairs are peculiar, simple at

pressed laterally, so that seen from above it appears wedge-shaped, and the frontal portion is prolonged into a kind of snout. The parts composing the mouth are so different from the ordinary types, that I shall leave it to others to determine them, and merely enumerate the organs from before backwards. 1st. Depending from the apex, we find two large processes which seem to be modified antennæ (fig. 54, *a*); they are two-jointed, the lower terminated by four acuminate claws. 2nd. A bundle of ten needle-like curved lancets (*mandibulæ?*) (fig. 54, *b*). 3rd. Posterior to these, two minute, half-ovate plates, serrate in front (fig. 54, *c*). 4th. A spoon-like process, articulated transversely, and acting as

an upper lip (*labrum*) (fig. 54, *d*). 5th. A pair of strong four-toothed jaws (*maxillæ ?*), (fig. 54, *e*), to which are jointed smaller processes bearing brushes of bristles (fig. 54, *f*). 6th. Two pairs of minute palpi situated on each side the mentum (*maxillary* and *labial palpi ?*) (fig. 54, *g*, *h*). [See Note, p. 78.]

Fig. 54.



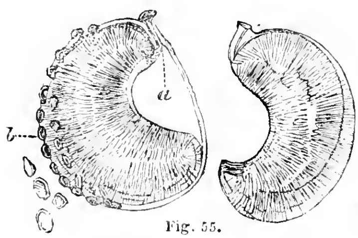


Fig. 55.

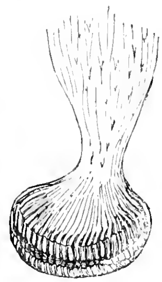


Fig. 56.

Fig. 54. Head, infero-lateral view. *a*. Antennæ. *b*. Lancets (mandibulæ). *c*. Palpi (leaf-like). *d*. Upper lip (labrum). *e*. Maxillæ. *f*. Brush-like process jointed with them. *g*. Maxillary pulp. *h*. Labial pulp.
Fig. 55. One of the air-cells detached. *a*. Trumpet-like canal. *b*. Pigmentary cells scattered externally.
Fig. 56. Gizzard, and lower portion of œsophagus.

The Eye (fig. 53) is large and black, and belongs to the conglomerate type, as in the eyes of entomostraca—*i. e.*, formed of a number of simple button-shaped lenses, imbedded in the pigmentary layer, and having no special corner. Those on the outer circle are free, and look like beads (fig. 53, *b*).

Having taken up so much time with the description of the superficial parts, I must discuss more briefly some points of interest respecting the internal economy. All desire to learn the secrets which nature hides so jealously—the circulation of the blood, and the functions of assimilation and reproduction; and when we meet with an animal so translucent that all the inner organs may be studied under the microscope without the trouble of dissection, the mind must indeed be jaundiced that is not stirred to wonder and admiration.

Organs of Respiration.—Insects are air-breathing animals, and the air is carried to their tissues directly by vessels called *tracheæ*, kept open by means of an elastic spiral fibre like the gas tubes so much in use. There are usually two main longitudinal trunks, from which branches proceed to the segments, and ultimately to every nerve and muscular fibril in the body. Now, in the larva of the Corethra, the only traces of the longitudinal tracheæ are the four air-sacs I have already mentioned as occupying the third and ninth segments of the body (fig. 50, *b*, *c*). These are attached in pairs. Seen from above the form is oval, and the surface irregularly reticulated with black dots; but when detached, or submitted to pressure under the microscope, they are oblong and crescentic, and composed of two coats, the outer smooth and tough, the inner highly refractive, and surrounded by a spiral fibre like ordinary tracheæ (fig. 55). I have seen no trace of air-vessels connecting these sacs, but attached to one end (and perhaps opening on the surface) is a short funnel-shaped tube (fig. 55, *a*). Whether capillary tracheæ are present, I could not satisfy myself, but it is certain that no conspicuous vessels exist. This is the more curious because in the perfect insect the tracheal system is said to be normal. Probably by watching the intermediate metamorphoses the difficulty may be explained.* Some observers look upon the air-sacs as mere floats, but I cannot agree with this view.

The black dots seen on the external surface are round or oval pigment cells, irregularly distributed on the upper side only. These are easily detached after death (fig. 55, *a*).

The Circulation of insects is imperfect: in part carried on by distinct vessels, and in part through channels excavated in the tissues. Its motive organ is the dorsal vessel; in fact, a compound heart, divided into segments by means of valves which allow the blood to flow forward towards the head, but not to return (fig. 57, *a*).

There are other orifices opening laterally into these segments, and also protected by valves, which by many authorities are said to communicate directly with the fluids of the body. But, as pointed out many years ago by Mr. Newman, in his admirable memoir on the Insecta (*Encyclop. Anat. and Phys.*), in some cases at least, the blood is returned to the dorsal vessel by longitudinal veins, which collect and carry it to the posterior chamber. It seems certain

* Professor R. Jones thus describes the remarkably sudden change following the assumption of the pupa state (*l. c.*, p. 103): "The air-sacs, situated both in the thoracic region and in the hinder portion, burst and unfold themselves into an elaborate tracheal system; and a pair of ear-shaped tubes, of which not the slightest trace could hitherto be discerned, make their appearance upon the dorsal aspect of the thorax. Two long tracheæ seem to be thus simultaneously produced, occupying the two sides of the body, and constituting the main trunks, from which large branches are given off, to supply in front the head, the eyes, and the nascent limbs; while posteriorly they spread in rich profusion over the now conspicuous ovaries, and terminate by ramifying largely through the thin lamellæ that constitute the caudal appendages."

also, that there exist lateral veins which open into each segment of the dorsal vessel, although from the absence of pulsation and colour in the blood, and their great delicacy and translucence, they are easily overlooked, or confounded with other structures. In its course through the body, the blood is brought into close relation with the tracheal system, and recent observations support the view that the blood not only bathes the exterior of the air-tubes, "but moves through that space between the outer and inner membranes in which the spiral filament is enclosed."

In the Corethra larva the dorsal vessel is a well-marked contractile organ, the walls remarkably delicate, so as to remind us of the same structure in the annelids rather than insects, and the valves, although apparently efficient, not so well defined as in some species (fig. 50, *m*, and 57, *a*). It is broadest near the tail, contracting a little in the thorax, and near the head divides into several branches. One of these runs backward along the upper side of the spinal cord; and accompanying the nerves given off from the centre of each gunglion, I think I could make out a slender branch running to the dorsal vessel. The structure may be compared to what is seen in the small water leech (*Glossiphonia biocu-lata*), where there is a capacious pulsating dorsal vessel, joining laterally very slender non-pulsating branches, which look more like threads of connective tissue than veins. As space will not allow me to enter into details respecting the nervous system, it will be better to note here, that on each side of the dorsal vessel—at least in the ten abdominal segments—we find ovate gunglionic bodies (fig. 57, *b*), evidently attached by filaments to the dorsal vessel, since they move up and down with its contractions and dilatations. These gunglia also anastomose with the nervous branches derived from the cord.

The circulatory system of insects is very simple, for as the nutritive fluids of the body are freely supplied with oxygen by the-air tubes, no complicated apparatus is required.

Digestive System.—I have already described the formidable array of jaws and lancets designed for the piercing and seizing of prey; we may next notice the apparatus for the digestion of food. First, in the thoracic region we find the *œsophagus*, which is narrow when empty, but capable of considerable distention (fig. 50, *d*). Its walls are thin, and composed of three layers: externally, an epithelial layer, easily detached and broken up; next, the muscular layer, with fibres running longitudinally and transversely; in the lower portion, oblique fibres are also visible, which decussate along the medial line. The lining membrane is delicate, and near the crop we observe the surface thinly covered with points like crystals. At the lower end the œsophagus contracts, and communicates with a curious compressed *gizzard* (fig. 56), formed of two valves, like the shell of a Navicula, and in like manner marked transversely with raised parallel lines. These rugæ are not affected by liquor potassæ, but it seems strange that an animal which subsists on the blood and juices of other species should require so powerful a crushing apparatus! A very narrow canal connects this organ with the proper digestive cavity, or *stomach* (fig. 50, *f*), which is readily distinguished by its brownish colour, derived from the large secreting cells which line the inner surface. Its direction is serpentine, the chief flexure pointing downwards; opposite the eighth segment it contracts into a narrow *small intestine*, and at the same point is joined by four filiform *biliary ducts*. Lastly, we arrive at an oblong colon, which terminates in a short rectum, closed by sphincters (fig. 57, *h*).

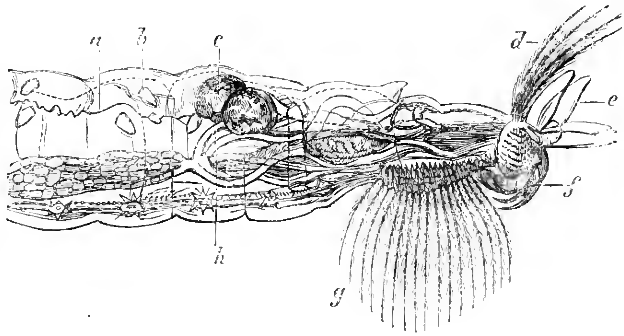


Fig. 57. Posterior segments, × 16 diam. *a*. Dorsal vessel. The dotted lines indicate the course of the ventral and transverse veins, returning blood to the dorsal vessel. *b*. Ganglionic bodies connected with it. *c*. Posterior air-cells. *d*. Superior fascicle of hairs. *e*. Four bronchial processes. *f*. Anal hooks. *g*. Anal fin. *h*. Nervous cord. Above which the four biliary ducts are seen entering the intestines.

I could have wished to say something about the nervous and muscular systems, both of which present many points of interest; and from the transparency of the tissues, and the absence of the fatty layer usually present in larvæ, are displayed much more clearly than is usual. But I have already trespassed too long upon your patience, and can only express a hope that others may be prevailed upon to investigate the subject, and complete the cycle of development, one phase of which I have attempted to paint.

Hedgehog.—In the Gironde vipers abound, and the hedgehog is the declared enemy of the reptile. Since so many hedgehogs have been destroyed, vipers have increased at a fearful rate.—*Land and Water*.

MORE GOSSIP ABOUT SPIDERS.

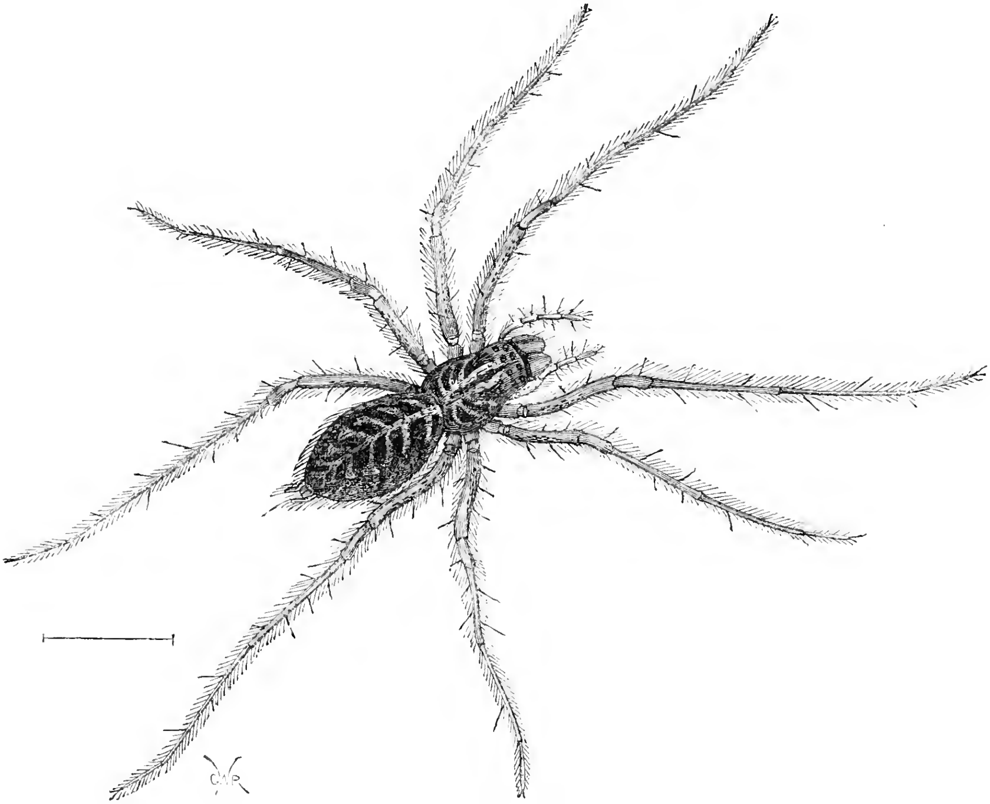


Fig. 58. *Tegenaria atrica*, enlarged.

My gossip on the present occasion is not about so small a thing as the *Theridion riparium*, but about one of the largest, most powerful, and ferocious of our indigenous spiders—the black, or dark-coloured, Tegenaria (*Tegenaria atrica*).

But I would preface my remarks by informing my readers that when naturalists speak of ferocity, cruelty, &c., in the lower creatures, they simply use convenient terms to describe the exhibition of certain instincts which bear a resemblance to such bad propensities in man. Do not, however, suppose, dear reader, that creatures described as cruel are really so. Spiders and other carnivora have been created for a special purpose; they have been endowed with faculties and powers, and have been furnished with organs adapted for the pursuit, capture, and destruction of the creatures upon which they prey; and it would manifestly be as impossible for a carnivorous animal to change its nature, and become a feeder upon vegetables, as it would for man to gnaw his way into an oak tree, and exist upon the wood. To say that the exercise of the powers bestowed upon them is prompted by malevolence is simply absurd.

But to my dark-coated friend. The female *Tegenaria atrica* is of considerable size, the whole body being rather more than five-eighths of an inch in length; the cephalo-thorax, which is very hairy, is of a yellowish-brown colour, marked with irregular dark brown bands; the abdomen is nearly oval, hairy, and of a light brown hue; the sides rather thickly marked with black spots; along the middle of the upper part extends a series of light brown lines, alternating with others of a darker brown. The eyes are eight in number (fig. 59). The four middle ones nearly form a square; the two outer pairs are rather oblique and raised. When viewed closely, they shine as brightly as minute diamonds.

Fig. 59.

The falces are large and very powerful, furnished with two rows of teeth, hairy on the inner surface, and nearly black. The legs are long and very hairy; the colour is reddish-brown, approaching to greenish-brown on the thighs; the posterior pair are one-quarter inch in length, the first and third somewhat shorter. Owing to the dark hairy legs

being considerably raised above the body (when the creature is at rest), which is thus partly obscured by them, and the fangs being black, this spider appears much darker than a closer examination proves it to be; this, added to the rapidity with which it moves, renders it an object of dread to most persons, particularly those who have an antipathy to spiders.

The *Tegenaria atrica* appears to be common in Middlesex and Surrey. I have found it abundant in the neighbourhood of Camberwell and Brixton. Its snare is formed in the angles of old walls, the corners of outhouses, &c., a very favourite place being a hole in an old wall, with a warm aspect, or any warm situation affording a convenient and dark retreat. The web forms a horizontal sheet of great strength, and sometimes of considerable size—one in my garden measuring 9 inches in one direction by 8½ inches in another; at one corner of this web is the tube which serves as a retreat for the spider, and frequently extends many inches into the loose stones, &c.

My own garden is surrounded by a wall presenting many requisites for a spider's comfortable domestic arrangements, the mortar having been removed in many places by exposure to the weather, and the wall itself being built with projecting supports. When I first came to reside here, I found the holes in it swarming with spiders of all sizes and colours, forming a perfect Eldorado for an arachnologist. Amongst them were several individuals of *Tegenaria atrica.* I erected a piece of rockwork, the back of which is exposed to the full heat of the summer sun, and during the two past summers every miniature cave and recess has been occupied by a Tegenaria, the situation affording great warmth, security, shade, and abundance of food, and offering many facilities for the observation of the creatures' habits; they have been undisturbed by me; one or two individuals have been far above the average size.

The Tegenaria possesses the singular power, in common with other spiders, of casting off and reproducing injured limbs, the limb injured being reproduced when the next moult takes place. The new limb is very frequently smaller than that which it has replaced, although this is not always the case, it depending in a great measure upon the part of the limb on which the injury occurs. In many cases the new limb is larger than the old. In the example figured (fig. 60), which I mounted for the microscope a few weeks since, it will be observed that one of the last pair of legs is nearly two-fifths of an inch shorter than the corresponding limb on the opposite side. In capturing a fine specimen a short time previously, I apparently injured one of the third pair of legs, which was carried higher than the others, so as not to come in contact with the earth. This limb was cast off three days after capture of the spider, which died before another moult.

The strength of this spider is marvellous. It is said that a lion can with ease carry off the carcase of a bullock to a great distance, and at a sharp trot; *Tegenaria atrica*, however, quite throws this feat into the shade. I have on several occasions observed young individuals seize and carry off, with as much ease as a cat would a mouse, a full-grown

Fig. 60. Young of *Tegenaria atrica.*

Diadem spider (*Epeira diadema*). The relative size of these creatures will be seen by referring to figs. 60 and 61, which represent the outlines of two specimens now before me. The Tegenaria figured is a small specimen, but, like all her kindred, was of a fearless nature; and when her web was agitated

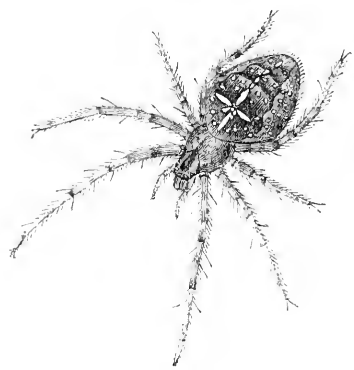


Fig. 61. *Epeira diadema*

with a spike of grass, would boldly seize it with her jaws, and allow herself to be drawn to the margin of her web before she would loose her hold—endeavouring at the same time to prevent herself from being pulled forward—presenting a ludicrous resemblance to a young puppy which holds on to a handkerchief or stick, and allows itself to be dragged about. As soon as the edge of the web was reached, my dusky friend always scampered back to her den.

The food of the Tegenaria consists of any creature unfortunate enough to fall into her snare, from the size of an ant, up to a good-sized beetle. Unlike the Diadem spider, which envelopes her victim in a winding-sheet before feasting on its juices; or the Theridion, which entangles the limbs of the entrapped insect—the Tegenaria, with the rapidity of an arrow, pounces upon her prey, and seizing it in her enormously powerful falces, despite its struggles, carries it to her chamber of horrors. When the captured insect struggles, the spider may be observed endeavouring to hold the limbs with her palpi, which are furnished at the end with a small curved claw.

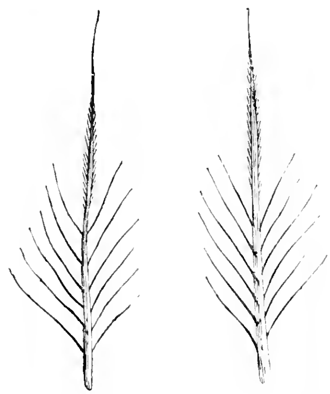


Fig. 62. Compressed sessile hairs magnified.

From long observation, I may state that the Tegenaria almost invariably seize their prey by the upper part of the thorax; they appear to do this instinctively, as they have evidently greater power over their victims; in adition to this, were they to seize the head, the comparatively soft body of the spider would be more exposed to injury from the claws and stings of insects captured, or from powerful jaws, claws, and spiny limbs, if seized by the abdomen.

I once noticed a beetle (a species of Carabus, I believe), common enough in gardens, fall into the web of a Tegenaria, which endeavoured to seize the beetle in the usual manner, but was unable to do so owing to the hard polished surface. Foiled in her efforts to carry off the struggling insect for some time, she suddenly seized poor beetle by inserting her fangs into the open jaws, which appeared even more powerful than her own, and carried him into her dark retreat. I did not learn the result of this capture. Notwithstanding that I frequently noticed this same spider carry off nearly as large insects, it is evident that smaller cheer are not disdained, as I witnessed her on one occasion standing motionless on a hot *clinker*, nearly two inches from the margin of her web—it was on one of the hottest days of last summer,—and surprised to see her thus, I watched her for some time, and soon noticed that several ants which were running briskly over the stones disappeared under the spider's body in a very sudden manner; I then ascertained that when any unfortunate individual came within her reach, said individual was at once snapped up; this appeared the more remarkable as from the creature's position, and the situation of her eyes, it seemed impossible that the ants could be perceived when so nearly under her; added to this, the body was raised some little distance above the stone. I concluded that the tiny things were seized by the palpi, and conveyed to the jaws; possibly an ant may be considered a dainty morsel by the Tegenaria.

Although the spider possesses so formidable a pair of jaws, there is an apparently defenceless creature which bids defiance to her terrible weapons, I refer to the common woodlouse (*Oniscus*) or "pill-beetle," for although I have again and again witnessed this crustacea fall into the web of the Tegenaria, I have but once seen one captured. No sooner is the spider informed that a meal is at hand than she is standing over her intended victim, who remains motionless for a short interval; the instant that the creature moves—for the spider never attempts to carry off any insect so long as it remains still—the Tegenaria strikes with her huge fangs, and appears somewhat disconcerted that the coat of mail wards off the blow; failing in her attempts to seize the armadillo, many equally unsuccessful efforts are made to turn the creature over, until apparently in dread of the strange object, poor spider scampers back to her den—perhaps to return to the scene of her defeat as soon as the woodlouse moves but seeming at last disgusted at her unrewarded exertions, her would-be victim is allowed to escape.

It does not appear to be so difficult a matter to deceive a spider as some of your correspondents seem to imagine, for during the warm weather, whenever I have occasion to water my garden, the Tegenaria inhabiting my rockwork have afforded quite an amusement. If but a few small streams from the rose of the water-can are allowed to fall upon their webs, a constant dance is kept up by the spiders, who rush at the falling threads of water, and scamper back as quickly when the drops descend upon their bodies—the movements at times being so rapid that the eye can with difficulty follow them. When but a single stream is allowed to flow for a few minutes, the spider upon whose web it falls makes incessant efforts to seize the fluid. The creature evidently does not acquire wisdom by experience, for the same experiment may be repeated day after day, and always with the same result.

It appears doubtful whether the poison of this and other spiders is fatal to the creature wounded, or simply has a stupifying effect; whichever may be the case, its action is very rapid, as an insect once

wounded soon ceases to struggle. On one occasion whilst removing the web of a very large individual of the geometric spider, I cast the spider herself into the snare of a *Tegenaria atrica*, which stood over the prostrate Epeira, ready to strike as soon as any movement became apparent. The Epeira, with legs gathered up, remained motionless — simulating death — for some considerable time. The spiders were on the margin of the web, where the texture is less dense than elsewhere, and either the weight of the spiders caused the lines to give way, or the Epeira had been watching her opportunity to escape, for suddenly she fell through the meshes—the Tegenaria rushed wildly about, as if in search of the savory meal which had just slipped from her jaws. The unfortunate Epeira only escaped the jaws of one foe to fall into those of another, which I had not previously observed, whose web was spread beneath that of Tegenaria No. 1, at the distance of six or eight inches. Spider No. 2 was a much smaller individual, and the Diadem seemed indisposed to yield herself a prisoner without some effort to escape. The Tegenaria seized her by the leg, and endeavoured to drag her into the den, until with a stick I drove her away. Instead of escaping, the Epeira fell over on her side, and exhibited no movement beyond a quivering in the limb wounded by the Tegenaria—a small globule of fluid appearing where the wound had been made. I touched the creature several times, but she was to all appearances nearly dead; and as she appeared active enough before she was seized by spider No. 2, I have no doubt that her loss of power was entirely owing to the wound inflicted by the poisonous fangs of the Tegenaria. Whilst removing the apparently defunct spider from the web, the Tegenaria suddenly pounced upon her and carried her to the larder.

Possibly, you do not feel encouraged to observe this creature's habits more closely. Do not, however, despise it because it presents few features attractive to the eye. Remember that it is not savage because of its formidable appearance and solitary habits: how frequently are rich colours and symmetry of form combined with seemingly savage propensities. Nor is the gloomy monster destitute of beauty, if by the term we mean simply pleasing to the eye. Examine by aid of the microscope the several organs of the body—how beautiful their structure, and how nicely adapted to fulfil the various purposes for which they were designed. The disposition of the various parts displays the same consummate skill exhibited in the arrangement of the scales on the wing of the richly painted butterfly, the feathers of the gorgeous humming-bird, or the tinted petals of the flower; and he is no true naturalist who fails to perceive beauty in even the most despised creatures.

Brixton. EDWARD H. ROBERTSON.

MAINE DEPOSITS.

IN the last volume of this journal the Diatomaceous forms found in a deposit from Monmouth, in the State of Maine, U.S., were figured and described. Through the kindness of the Rev. E. C. Bolles this deposit was very widely distributed amongst microscopists in this country; and, again, we are indebted to the same gentleman for similar deposits from other localities in the same State. These sub-peat deposits are far from uncommon in the United States, and to Dr. Meade Edwards we are indebted for samples from other and distant localities. As the Maine deposits have been sent over for exchange amongst British microscopists, it is to them that the first attention should be given; and it is proposed to describe and figure, when requisite, the principal forms which have been detected therein. One of these deposits is known as the "Duck Pond," and is found at Waterford; the other as "French's Pond" or "Chalk Pond," from Albany, both in the State of Maine, and at least one hundred miles distant from Monmouth, whence the deposit already described was obtained.

At present we are deficient in any precise information regarding these deposits other than already indicated. Many of the forms found in the Monmouth material are more or less plentiful in the other two deposits. Of these we may enumerate *Pinnularia gigas*, figured in SCIENCE-GOSSIP for 1867 (p. 181, fig. 189), *Pinnularia dactylus*, *Pinnularia stauroneiformis* (SCIENCE-GOSSIP 1867, p. 133, figs. 142, 143), *Navicula firma*, variety β (p. 156, fig. 151), *Navicula rhomboides*, variety β (p. 157, fig. 158), *Surirella intermedia* (p. 180), *Surirella linearis* (p. 180, fig. 187), *Stauroneis phœnicenteron*, *Stauroneis legumen* (p. 157, fig. 160), and the crenate *Eunotiæ* (see p. 158). Many forms which are found in the Monmouth material do not occur in these deposits at all. Of these may be enumerated *Navicula serians*, variety β, *Navicula firma*, variety δ, and *Actinella punctata*. The diatoms found in the Duck Pond and French's Pond deposits are less perfectly preserved than those in the Monmouth, and are much more difficult to separate, requiring the aid of an alkali to render them available for microscopic examination. This circumstance would seem to indicate that the present deposits belong to an earlier epoch than the Monmouth. This siliceous cementation is very apparent in the early marine deposits, some of them requiring the aid of strong caustic potash, or soda, to break up the material. A Californian deposit known as "Monterey stone" will only yield to that treatment when broken up into small fragments.

The other American fresh-water sub-peat deposits, before alluded to, are those of East Stoughton, Salem, and Ipswich, in the State of Massachusetts;

Laconia and Bemis Lake, in New Hamsphire; Greenwich, in Connecticut; and Monticello, in New York.

The following are some of the rarer forms in the Duck Pond and French's Pond material.

Navicula firma, variety ε. Valve with three undulations, apices rostrate, the peculiar central blank space small and inconspicuous, striæ transverse, delicate. French's Pond (fig. 63, × 500).

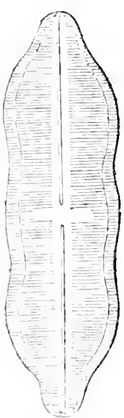


Fig. 63.

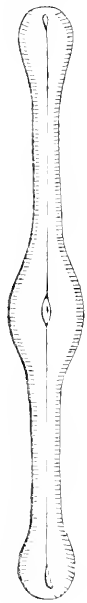


Fig. 64.

Fig. 65.

This species, according to Dr. Lewis, resembles *Navicula Hitchcockii* in its marginal undulations and sharp parallel transverse striæ, but differs essentially in the median line, which in *Navicula Hitchcockii* is remarkable as having on either side a double line nearly parallel to its course throughout. Never having seen an authentic specimen of *Navicula Hitchcockii*, I am unable to determine the distinctness of the latter species from the triundulate variety of *Navicula firma*.

Navicula elliptica (Kutzing). Valve elliptical, striæ distinctly moniliform, about 21 in ·001, median line and central nodule distinct. French's Pond. This species seems to be universally distributed, and is more or less plentiful in most of the North American deposits.

Pinnularia polyonca (De Brebisson), variety β. Valve narrow, linear, with central and terminal inflations, costæ marginal, 24 in ·001″. French's Pond (fig. 64, × 400). The form found in this deposit differs from that found by M. De Brebisson and Dr. Lewis (outline, fig. 65); the centre and apices are suddenly and equally inflated, and the margin between the inflations straight; the typical form is undulate, with a large central inflation.*

Pinnularia cardinalis (Ehr.), variety β. Valve linear, extremities rounded, costæ slightly radiant, about 24 in ·001″, absent from centre of valve. French's Pond (fig. 66, × 400). It is with hesitation that I place this form with *Pinnularia cardinalis*, differing as it does in size (the largest valve I have seen scarcely exceeds a quarter the size of the true *Pinnularia cardinalis*) and closeness of the costæ—differences which do not, however, warrant making it a new species.

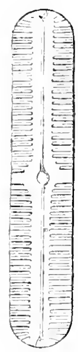


Fig. 66.

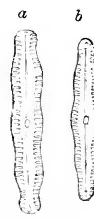


Fig. 67.

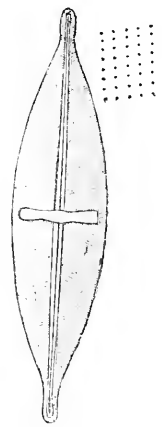


Fig. 68.

Pinnularia nodosa (Smith). Valve with three, more or less, distinct inflations, extremities subcapitate, produced, striæ marginal, 18 in ·001″. French's Pond (fig. 67 *a b*, × 300). This pretty little form is common in the American deposits, but variable in outline and length. It is the *Navicula nodosa* of Kutzing and Gregory (*Mic. Journ.*, vol. iv., pl. 1, fig. 5).

Stauroneis Stodderi. (Greenleaf) F. V. Linear, with slightly rounded ends. Valve elliptic lanceolate, or lanceolate, apices more or less produced, stauros linear reaching the margin, longitudinal striæ distinct, about 30 in ·001″, transverse, slightly radiant, about 55 in ·001″ (fig. 68, × 500). French's Pond; very scarce in Duck Pond. This very beautiful form is named after Mr. Stodder, its discoverer, by Mr. Greenleaf, of Boston, U.S. Dr. Lewis, who describes it, says, "The valves are singularly light and graceful, the linear striation giving the surface much the aspect of a Lepisma scale. When the valve is examined by the aid of oblique light (the valve at right angles to the light), the longitudinal striæ appear to cross the stauros. When the valve is placed at an angle of 45°, both longitudinal and transverse striation are seen (fig.

* The form described by Dr. Gregory in *Microscopical Journal*, vol. ii., under the name of *Pinnularia undulata*, is not the *Pinnularia Polyonca* of De Brebisson; the latter has never been found in Great Britain.

68 *a*, × 1000), showing a similar arrangement of markings to those seen on *Pleurosigma fasciola*.

Surirella Baileyi (Lewis). Valve linear-lanceolate, extremities slightly rounded and produced,

Fig. 69.

Fig. 70.

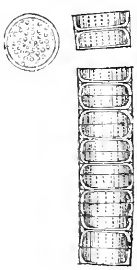


Fig. 72.

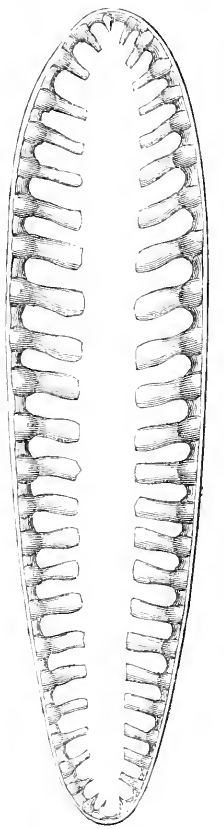


Fig. 71.

alæ and canaliculi conspicuous, striæ distinct, reaching median line (fig. 69, × 500). This bizarre form of *Surirella* occurs sparingly in both deposits. In the French's Pond material I have only seen fragments; perfect valves will be found in the Duck Pond deposit. Dr. Lewis, in his description of the specimens found in a gathering from Saco Pond, says slightly attenuated near the central portion (fig. 70, outline of his figure). I do not, however, detect any attenuation in the majority of valves found in these deposits.*

S. nobilis (Smith), fig. 71, is common in both deposits.

Orthosira nivalis (Smith). Frustules sub-cylindrical, valves sub-hemispherical, distinctly cellulate, cellules circular (fig. 72, × 49); common in both deposits. This species is doubtless the *Coscinodiscus minor* of the first volume of the Synopsis. The *C. minor* of Kutzing is a marine species.* I hope to continue the description of the diatoms found in these deposits, and also one from another locality in Maine (Bridgton) in which I have detected some very interesting forms.

F. Kitton.

Norwich.

* Both figures too much constricted.

DEATH-WATCH.

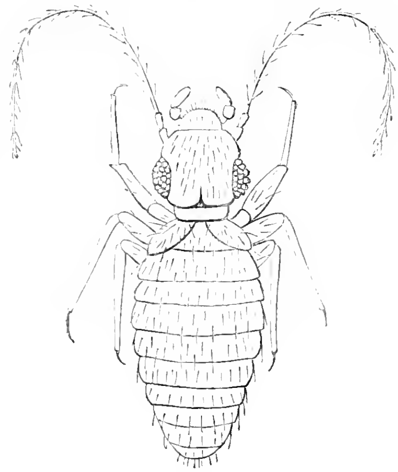


Fig. 73.

Atropos pulsatoria, magnified.

Early in the month of August last my attention was arrested by the acute sounds of "Death-watch"—sounds most welcome to me, as I longed for the pleasure of capturing one of those insects, never having seen one, and seven long years having passed since my last unsuccessful hunt. This time, however, I was determined not to be foiled if it was in my power to prevent it.

I traced the sounds to the back of a framed picture, where, under the paper cover, I succeeded in discovering a pair of *Atropos pulsatoria*. The sounds instantly ceased, yet I continued the search under such circumstances that any other insect, even smaller than Atropos, could not have escaped my notice.

Two or three evenings after this I captured another specimen, this time on the *outside* of the back covering of a picture. I observed this one for some time, *alternately* running and ticking, but could not detect the *two* being continued at the same time.

During the following week I was aroused by the "tick" near my bedhead; this I traced to the skirting-board of the room. Anxious to discover, if possible, the means by which the sound was produced, I lay full-length on the floor, candle in one hand and pocket lens in the other, for a full hour. But I failed to detect the cause of the sound, although I watched his movements closely, which were divided between running and ticking.

I would suggest, however, that the cause be looked for in the movements of the mandibles, aided possibly, by that formidable labrum (upper lip), and not in the tapping of the head against a hard substance.

In September last I captured an Atropos at Scarborough under the torn edge of a wall-paper.

In December last I was told of a cellar dwelling where "the awful Death-watch" haunted. There I captured three under the worn paper covering of an old box; and the ominous sound has not since annoyed the inhabitants.

On the 28th of January, on entering my bedroom, I was saluted by the—to me—cheerful tick. Tracing it to the back of a picture hanging against the wall, and satisfactorily ascertaining that the sounds proceeded from an Atropos, I let him live, that I might enjoy his music, while I lay pondering on this marvel of creative skill—for marvel indeed it is—that so loud a sound should be produced by so small and delicate a creature.

Having learnt from your interesting and useful publication that this question of Atropos was a disputed one, I have exercised more care in the above observations than I should otherwise have done, and the only question with me now is, by what means are the sounds produced.

Bradford. T. Prince.

ZOOLOGY.

A Plea for Birds.—We heartily concur in the spirit which prompted the Rev. Pemberton Bartlett to write his very little book on this subject. We have often protested not only against the wholesale slaughter of little birds, as a great mistake, but also against the wanton destruction of rare visitors committed in the name of science. Let us hope that the "Plea" will be heard and regarded.

Forcing Pupa.—On December 14th I put a pupa of the Buff Tip (*P. Bucephala*) on some mould in a box, and covered it with damp moss (damping the moss every two or three days at least, as the heat absorbed the moisture so quickly), and kept it on a high mantelpiece over a kitchen range. On January 15th, 1868, the perfect insect appeared. On January 17th I put a pupa of the Privet Hawk (*S. Ligustri*) in the box, and kept it in the same place. On February 27th the perfect insect emerged; it is a very fair specimen, measuring three inches ten lines from tip to tip.—*S. J. Barnes.*

Oh, Snakes!—A few days since a man ploughing a fallow close to my house, turned up an old bottle, and in it were a pair of common snakes (*Coluber natrix*), no doubt having hybernated in the same, finding it a dry retreat.—*W. H. Cobb.*

Ant-hills.—Your sketch of the Wood Ant (*Formica rufa*), and its temple, contained in the last number of Science-Gossip, brought vividly to my memory an almost forgotten half-hour of pleasantness spent some time since in the immediate vicinity of a few of these colonies of industry. About six or seven years ago, when on a visit to Keswick, a friend took me to see the ant-hills with which the woods in the neighbourhood of Sowdon abound. We singled out one of these hives of activity with a view to the better observing of the habits of the little creatures. They were all intently employed in collecting and piling up pieces of grass, straw, stick, and other matter into conical-shaped heaps. Among the many thousand indefatigable workers, one especially courted my attention: I first noticed it at a short distance (eight or ten inches) from the hill which their concentrated efforts were rapidly forming. It was then tugging at a piece of straw, and was endeavouring to get it along towards the scene of activity, but was clearly unable to do so because of its great size. Finding, I presume, its strength unequal to the task of successfully conveying the load to the heap, it left it, and sped away to the crowd of fellow-labourers, to whom, by some medium too subtle and refined to be perceived by my dull senses, it communicated information respecting its difficulties, for it almost immediately returned with several others, and by their combined efforts—each one taking its place with as much order as men do when transporting timber or other large body—the piece was soon deposited at the foot of the pile. This done, one of the ants ascended about the length of itself, and, stooping down, laid hold of the straw by one end, and, with the assistance of the others pushing, drew it up. These movements several times repeated, at last placed it in a very exalted position in the structure. This interesting incident gives rise to the following question: Do not ants possess a measure of reasoning power imperfectly and incorrectly expressed as instinct? From what passed before my attention, the conviction forced upon me was that these humble creature do possess mental faculties, somewhat analogous to those we call perception, reflection, and judgment; and that by virtue of these endowments they act, not uniformly as machines, but variously, in view of accidents, conditions, or consequences. Also they would appear to have a medium by means of which they can communicate their cogitations to each other. I shall be glad to know what are the notions of other readers of Science-Gossip respecting these matters.—*B. Taylor.*

Mouse-killing Fowls.—Several instances of fowls being adepts at mouse-killing have come under my own observation. In my youthful days I was very fond of the sport of killing rats, and this

propensity used to make me very zealous in attending at the removal of every stack of corn in my own village where a rat was likely to be found. Whilst looking after the rats, I have seen the fowls which have been attracted to the spot by the stray grains of corn, gobble down live mice as they have tried to escape. I also well remember an old cock of the Dorking breed who was so fond of mice that when a corn-stubble was being broken up by the plough, he would be in attendance to catch any poor mouse that might be turned out of its home. As soon as one was seen he pounced upon it and swallowed it immediately, and he would continue at his post until he had captured sufficient for a meal. He followed this practice for years, and his attachment to mice ceased only with his death.—*R. B.*

Curious Chrysalides.—On 2nd March I exhibited three large Chrysalides at a meeting of the Entomological Society; they are from Sierra Leone, and one of them is the most curious looking chrysalis I ever saw; it is two inches and a half in length, stout, and very compact, the shell being very hard and black; there are eight small protuberances on the thorax; two of them, placed close together just over the base of the antennæ, form a sort of small beak, while two just above these, and wider apart, look like eyes, and the effect is to give this part a strange resemblance to the head of a porpoise. The other extremity is equally curious, being furnished with a very strong flattened tail, above which at the base are two oblong pits about a quarter of an inch deep, the use of which it is very difficult to conjecture; the segments of the abdomen are stoutly edged and slightly toothed. Mr. Roland Trimen has informed me that it belongs to the genus *Antheræa* (a near ally of *Saturnia*), and that it is subterranean. One of the others is a *Chærocampa*, remarkable for its form, being greatly attenuated towards the head. The third specimen is a small species of Sphinx, the proboscis of which is of great size, projecting boldly from the head: hitherto these projecting "noses" have been thought to contain the whole of the proboscis, but I have found on examination that they contain a portion only, which is abruptly folded back on reaching the end of the case, and always terminates between the ends of the wing cases.—*T. W. Wood.*

An Usurper.—Amongst a number of miscellaneous notes on Natural History, I find the following, which will be interesting to ornithologists. *May 31st*, 1857.—A pair of martins began building under the eaves of the house about three weeks ago, and had half finished the walls of their nest when I thought they must have forsaken it, as it did not seem to approach any nearer completion. To-day the reason is apparent, for I saw a spotted flycatcher fly from the half-built nest, and on rearing a ladder and going up to it, I found she had built on the swallow's foundation, and had then laid one egg. Whether the martins had first forsaken the nest, or the flycatchers had driven them out, I cannot tell. Sparrows often take possession of swallows' nests, and long and fierce are the battles that ensue between them and the rightful owners. *June 24th.*—To my surprise, the martins have, for the last day or two, been re-engaged at their nest, and have nearly finished the outside. Upon examination, I find the nest of the flycatcher still within, but empty. I do not know how long the flycatcher sits, nor how long it is before the young birds leave the nest; but there may, perhaps, just have been time for this to take place; and I suppose that the flycatchers had driven the martins away in the first instance, and that the poor birds had actually waited patiently till the usurpers had hatched their brood, and quitted their ill-gotten possessions. The martins may have been fighting all the while with the flycatchers, and have at last been victorious; still I have not seen any warfare going on, and the egg has disappeared. But in either case, the martins have been thrown back in their work more than three weeks, and the female must have had the power of retarding the formation of her eggs; for if the flycatchers had not retained possession of the martins' nest, they would surely by this time have finished building, and laid all their eggs, if they had not hatched a young brood.—*Robert Holland, Mobberley, Cheshire.*

The Parson Bird.—I have at present residing with me a friend from New Zealand, and among many other items of information, he told me that in New Zealand there are a number of birds popularly designated Parson Birds. The name is derived from their peculiar appearance. The birds are black, with a white band down each side of the breast, the bands somewhat resembling those worn by ministers when in pulpit costume. One reputed habit of these birds is very extraordinary. The Parson Bird lives on mollusca, and may be seen walking along the seacoast in search of food, carrying a pebble in his beak, peering about from side to side in quest of his molluscan dinner, and as soon as he observes an unfortunate bivalve mollusc with its shells open, it drops the pebble between the shells, and at his leisure, and without danger to his bill, partakes of his food, the mollusc being unable to close its shell because of the intervention of the pebble. My friend obtained the skin of one of these birds, but has not seen any of them in the act of feeding. The practice of dropping the stone for the purpose of keeping its shell open during feeding, is so strikingly inventive, that I shall be glad to have the statement confirmed by any reader of Science-Gossip, it being worthy of record if true.—*T. P. Barkas.*

BOTANY.

Yellow Violets are common around here (Philadelphia, U.S.)—*Viola pubescens* (common yellow violet) and *Viola hastata* both bear a bright yellow flower about May or June. I have found them frequently in the rocky woods bordering on the Schuylkill river, also on the Wissahicon, near the city, and will forward you the first of the season. *Viola pedata* (Pedate Violet) is a far more beautiful plant than *Viola Muhlenbergii* (Muhlenberg's Violet), mentioned by Mrs. Watney; it abounds on the rocky banks of the Wissahicon: some years ago I crossed a piece of waste ground on the banks of that stream which was literally carpeted with them. All these plants seem to require a peaty or partially peaty soil; they stand the winters well, which are much more severe here than in England; they also bear transplanting, and I have no doubt could be easily cultivated in England, and would hardly need greenhouse culture. We have a great variety of violets here, but all lack that delightful odour so inseparable from the name of our beautiful but modest English favourite. Perhaps Mrs. Watney has mistaken "*Viola pedata*" for "*Viola Muhlenbergii*."—*George Worley, Philadelphia, U.S.*

Beauties of the Wilderness.—Some philosopher has said that no being is ever called on to empty a cup of unmitigated bitterness; that no matter how dreary the lot may seem, it is yet relieved by gleams of sunshine. So in the material world, nature has her compensations. How often the botanist notes that in the most desolate and barren spots grow many of the richest and most elegant of our wild flowers. Take this picture as descriptive of many of the little lochs I encountered last August, away amongst the wild and lonely bogs of Connemara. The scene is not far from Roundstone, a little lake whose clear waters are begemmed abundantly with the chaste but magnificent blossoms of the white water lily. From its bosom tiny cranogue-like islets rise bosky with blackthorn and hazel. With these are intermingled majestic plants of the Royal Fern, whose regal fronds also fringe the lake shore. The whole is surrounded by a belt of moor gorgeous with the large purple bells of the Irish heath. The pure mountain air is balmy with odours sublimed from thousands of shrubs of the sweet gale and other fragrant wild plants. No wonder that the language of Cowper comes up involuntarily, and one designates such a scene

> A region where, in spite of sin and woe,
> Traces of Eden still linger below.

Though late for this species, I yet found the white water lily splendidly in flower early in August, and thus contemporary with *Dabeocia polifolia*.—*S. A. S., Belfast.*

Carmine Peziza.—On reading over an article entitled "Cornish Colloquies," in Science-Gossip for August last, I observe that the author alludes to this lovely scarlet fungus, and writes to say that should "A. C. P." like to have a few tiny cups for a case or cabinet, I will, with pleasure, send her some, for I constantly find the Carmine Peziza in my walks about Hambledon. I sent a nice collection last year to a young lady, a friend of mine in town, who found they retained their brilliant colour and shape for a very considerable time under a glass shade. "Fairy tea cups" is the name they are known by here.—*Helen E. Watney.*

Local Names.—The article on "Local Names" of plants, birds, insects, &c., which we promised some time back, is now in active preparation, and we shall be glad if those of our readers who have any additions to make to the list will forward them to the Editor as soon as convenient.

Stinkhorn Fungus in Midwinter.—I was surprised to find when going through my garden in the middle of December last, a fully-developed and well-grown plant of *Phallus impudicus*, never remembering to have seen this fungus at such a period of the year as midwinter. It lasted much longer in its perfect state than when it makes its appearance at the ordinary season of the year, neither was it so offensive as in the hotter weather. —*W. P., Llandderfel.*

Are Holly Berries Poisonous?—I felt much interested on reading Mr. Newlyn's note on holly berries in Science-Gossip for March. That holly berries are not a wholesome article of diet, I think there is no doubt; but that they are "little less dangerous than red-lead or arsenic" is doubtful, because holly berries are described as purgative and emetic. I do not think we are justified in at once jumping to the conclusion that they are a dangerous poison. It is well known that birds eat holly berries; in fact, during the prevalence of hard weather, "along about Christmas time," these berries are almost the only food accessible to many of our feathered friends; and were this food so poisonous as Mr. Newlyn would have us believe, we might expect to have our paths strewn with dead birds after a few days' frost—from the effects of poison, and not from the want of food, as many would conclude to be the case. I do not wish to question Mr. Newlyn's veracity; but we have already so many fabulous poisons, so many harmless, nay even useful products of the vegetable kingdom branded with bad characters, that I think we ought to be very careful in adding to the list.—*Henry Elliott, Bodorgar, Bangor, North Wales.*

MICROSCOPY.

Pocket Cabinet.—Mr. W. Moginie, of 244, High Holborn, has designed a compact little pocket cabinet, which is made of pine or oak, and contains three or four divided trays opening on pivots like a French rule, so that any object in any tray may be found at once. Each tray holds six objects, and the whole is very compact for the coat pocket, at a moderate price.

A Struggle for Life.—In examining some refuse water from a small aquarium, the contents of which were mostly obtained at the Menai Frith, I found, among a number of interesting, and some, to me, unknown forms, several examples of a large species of Infusorial Animalcule, agreeing in every particular with the *Kondylostoma patens* of Dujardin, who includes it in his family "Bursarina." While observing the well-marked characters and elegant motions of this "giant among the pigmies," there dashed wildly into the field, a small Rotifer

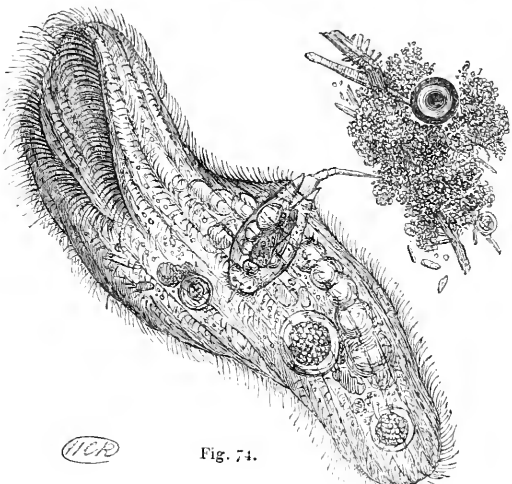


Fig. 74.

(*Colurus*), who, appearing unable to stop itself in its rash career, passed at once into the widely-extended mouth of the Kondylostoma, and became enclosed in its transparent body. For a second, the little Rotifer remained quiet; as if not quite understanding what was the matter; then suddenly beginning to kick violently, it forced its sharp foot through the side of the Animalcule, and grasping with its forceps some vegetable matter, retained between the glasses of the compressorium, it held on stoutly against the whole force of its powerful captor. The affair now became exciting. The Kondylostoma struggled to get away; the Colurus refused to be carried off; and the two antagonists began to revolve rapidly around a centre near the air-bubble figured in the illustration. Slowly the Rotifer was pulled further and further out; until, at last, its widest diameter being free, it escaped. The wounded Kondylostoma swept out of the field; and the little Colurus, after giving a few final kicks, projected its tufts of cilia and steamed away again, as if nothing very peculiar had occurred. Thus ended one of the countless multitude of strange scenes, revealed only to those who pore down the brazen tubes, and waste the midnight camphine. To the microscopic student what myriads of odd shapes and ways of life become familiar! Transposing the well-worn quotation that the "world is a stage," may he not justly say of this instrument, that its "stage is a world"?—*H. C. R., Kensington.*

Resin *versus* Balsam.—I have lately been making some experiments with resin for mounting transparent microscopic objects in, instead of balsam, and the results are so far entirely satisfactory. I now forward you particulars, as I believe the information may be acceptable to many of your readers. It came to my knowledge that a certain microscopist was in the habit of heating his balsam over a spirit-lamp, for the purpose of driving out the turpentine, and then of softening the result (which is a pure resin) with some fluid, so as to make it workable for mounting purposes. A chemical friend who was present when this information was given me expressed an opinion that benzoin would dissolve the resin, and if pure resin could be obtained all the trouble of driving out the turpentine from balsam might be saved. I obtained a small quantity of pure resin from the works of Messrs. Pechin & Co., of Salford, and with the aid of heat soon obtained the proper mixture for mounting purposes. I have mounted some fifty objects with the mixture, and the results are so far perfectly satisfactory. The air-bubbles soon disappear, and the mixture hardens much quicker than Canada balsam. Instead of saturating the objects in turpentine, as I formerly did, I now use benzoin, as I find the latter ferments the tissues much more quickly, and thus drives out those old enemies—so hard to get rid of—air-bubbles. All objects mounted with this mixture should be saturated, if it be but for a moment, in benzoin. Many kinds of animal and vegetable hairs, and various other objects, require only to be dipped into the benzoin, and then mounted directly without further preparation. Other objects require a longer saturation or soaking. Some objects, such as complicated tissues, require several weeks before the whole of the air is driven out. It should be noted that resin is usually more or less mixed up with woody fibre or other matter, so that if any of your readers are inclined to follow up my experiments, they should be careful to select resin for the purpose very carefully, or they may spoil or destroy the very objects they desire to preserve.—*Thos. Brittain*, 58, *Upper Brook Street, Manchester.*

NOTES AND QUERIES.

House-flies.—Where do house-flies deposit their eggs? This has always been a mystery to me, and I was more astonished than ever on hearing the following from a friend. He had been, last autumn, preparing some Extractum Conii, and had laid aside the jar from which he had decanted the extract, leaving some dregs still in. On going to it, some three weeks afterwards, he found a few maggots clinging to the sides of the jar by small and delicate legs. These creatures were of a light brown colour, with a hard integument, and their bodies were divided into segments; in fact, at first sight they were like small woodlice, about a quarter of an inch long. He preserved them in a bottle in the warm, and shortly there came from them what appeared to be ordinary house-flies. Now can any reader of Science-Gossip tell me for certain what the insects were and whether house-flies or not, why they should have chosen such a poisonous home, unless Conium has no effect on the lower orders of animals?—*C. H. B.*

Rearing Larvæ.—Could you give me any information on the management of larvæ of *Dasychira fascelina*—as I have for two years obtained a large number of larvæ of all sizes, but never been able to rear an imago, the larvæ always dying when nearly full grown?—*J. M. Hick.*

Answer.—I think the reason of Mr. Hick's failure with larvæ of *D. fascelina* is probably due to one of two causes: 1. It requires change of diet, especially at the age he mentions. The species is very partial to dwarf fallow. 2. The food should not be too juicy. The native haunts of the species are generally bleak, such as exposed heaths; and species inhabiting such spots are very apt to die off three-quarters grown if provided with too juicy provender.—*H. G. K.*

Anachronisms in Science.—I have, in common with most of your readers, admired the two beautiful woodcuts given in the February number of the Gossip, from Professor Blanchard's work. They are fine studies of insect life, and artistic in their grouping; but while we admire all this, still, to my mind, they have a great defect, that of figuring the caterpillar, pupa, and imago in one picture. Now pictures should represent what is seen at a glance, and can legitimately only take in what can occur at the same time; and in this they should differ from diagrams, one of which may lawfully represent many points of sight, scales of size, and periods of growth, even in the life of an individual. These different modes of treatment ought to separate perspective from geometrical drawing. Great painters have, however, sometimes fallen into this error; Rubens painted himself between his two successive wives, to the amusement of his contemporaries. Imagine an artist representing himself and his remote ancestors in one picture, and his boyhood and manhood in another. These anachronisms in insect representation I think are not more justifiable.—*C. O. G. Napier, F.G.S.*

Acacias.—Acacias and Mimosas appear to be peculiarly desert plants; some species of the tribe being found in almost every known desert. What special properties have these plants to enable them to flourish in scanty soil, and to resist drought?—*C. E. D.*

Insects Growing.—Surely, both the large and small flies we see in our houses, on walls and windows, are all of them full-grown insects—flies of different species. Insects of course grow, but not after they have attained their *perfect* form, at any rate those I have watched did not. I was first led to inquire into the matter by the very passage in Mr. Wood's book which "F. M. N." has quoted. Has "F. M. N." ever watched a butterfly in its transformations, and noticed how short a time the wings are in expanding? The few seconds occupied in this process was once called by a juvenile friend of mine "the butterfly's growing time,"—we were looking at a beautiful specimen that had just burst its case open, and the "*growth*" of the wings astonished him. I also think that if "F. M. N." will carefully examine his *small* grasshoppers, he will discover them to be *wingless*, or nearly so. They only attain to the full dignity of perfect wings, I imagine, when grown up, consequently Mr. Wood's statement that "the *winged* insect never grows," is not our theme, because grasshoppers in the pupæ stage skip about. A grasshopper's transformations are partial only. There is a *wingless* grasshopper in America; it is very like a cricket in shape, and hides away under stones.—*H. E. Watney.*

New Zealand Greenstone.—This mineral is called in China imperial jade, and is found in various localities in China, Turkey, Little Thibet, the Himalaya mountains, and the river Amazon. The locality nearest home is Schwemmsal, near Leipzic. It is found in solitary blocks in alum-shale, and is often washed down by rivers. It is sometimes found in large masses, and in China is an imperial monopoly. Its colour varies from the palest leek green, almost white, to deep sap green. It is usually translucent, but sometimes nearly opaque. There is a red variety less pretty, I think, than the others. Jade is excessively valued in China, being bought up at the sales of mandarins' effects at high prices. I saw a set, a tea-pot, four tea cups, and box for sweetmeats, all of pale green jade, standing upon an oval dish of red jade 12 inches by 9, which had been brought from the summer palace at Pekin. The cups were carved with lotus and other emblems. These in China were said to be worth £2,000, but at Christy's sold for £250. I saw at the same time a host of bowls, cups, and other utensils of jade which I have not space to particularise. The locality in New Zealand where the jade is found is said to be a secret. I remember reading in "Thomson's New Zealand" that the greenstone is not found in the island at all, and is supposed by some authors to have been brought by the Maories from Haiwacki, from whence they say "the seed of their coming is." The Rev. J. G. Wood exhibited, before the Anthropological Society, last week, a curious ornament carved with foliage, exhibiting a revolving wheel cut out of a solid piece. It is a silicate of magnesia and lime. Its hardness has been much exaggerated, being really that of felspar and less so than quartz. Any practical lapidary could easily cut it with emery, still more easily with corundum. I mention this because some time ago it was stated that nothing would cut it but diamond-dust. I am not surprised that it is undervalued by European jewellers, for it has neither brightness of colour nor lustre, and the commonest chalcedony is prettier.—*C. O. G. Napier, F.G.S.*

Dog-fleas.—Can any one tell me how to rid a dog of fleas? I have tried repeated washing in a strong solution of soda without effect.—*L. P.*

Insects never Grow.—The mealy bug (*Coccus Sp.*), numerous species of aphis, and the females of termites grow prodigiously after they have attained their full development as imagos; not so grasshoppers, locusts, &c., although they do so in the earlier stage. But as in these insects the stages are less clearly defined to the eye than in Coleoptera or Lepidoptera, the superficial observer might easily imagine that they grew in all stages. The same may be said with the aphis and blatta, or cockroach families. Female moths and flies, if they do not increase in length, do so greatly in girth, after they attain the perfect state.—*C. O. G. Napier, F.G.S.*

Chrysalis in Rock.—In Science-Gossip for last October I gave an account of a chrysalis found in a piece of rock under rather strange circumstances, promising if the imago ever appeared to inform you of it. On Saturday last, by chance I opened the box where it was placed, and, to my astonishment, saw an insect rapidly running to and fro. It had but just emerged from the pupa case, as the wings were not developed until an hour later. The insect, which at first sight much resembles the common housefly, is quite new to me, but doubtless is well known to entomologists. It belongs to the *Diptera*. The eyes are prominent, antennæ and palpi short; the thorax is broad (same width as head); the abdomen narrow and hairy; tibiæ also hairy, with rows of strong bristles; the tarsi have five distinct articulations, terminated by two claws.—*M. Pope, Weymouth.*

Expansive Power.—In reply to your correspondent, Edwin Holmes, allow me to inform him that the facts which he states in his quotations from an article on the "Temperature of Lakes" are entirely incorrect. Water contracts during the process of cooling only until it reaches + 4° centigrade; it then expands, instead of contracting, for any further loss of temperature; until it reaches 0° C., when it assumes the solid form, and in so doing undergoes a further expansion. Let us now see how that which I have stated above applies to the economy of lakes and seas. Imagine a large body of water the surface of which is exposed to the atmosphere. If, now, the temperature of the atmosphere falls, the layer of water in contact with the superincumbent air becomes denser and of greater specific gravity, and therefore sinks. This continues until the temperature of the whole mass of water reaches + 4° centigrade; then, as it becomes colder, instead of the surface-layer contracting, it expands, becomes lighter, and therefore remains at the top, while the whole of the water underneath never falls below + 4° C. Now what would have taken place were it not for this peculiar property of water? The upper layer of water would have continued to become colder and denser, and consequently to sink until the whole mass attained the temperature of 0° C., when upon the slightest further decrease of temperature the whole mass would become solid.—*J. J. J.*

White's Hybrid Pheasant.—In my copy of "White's Selborne," by Capt. Brown, there is a note by the Captain as follows:—"This curious *lusus naturæ* is now in the collection of the Earl of Egremont, at his seat at Petworth, and is allowed by naturalists to be a mule between the blackcock and common pheasant," p. 292.—*C. O. G. Napier, F. G. S.*

Medium.—Will any of your correspondents kindly answer the following queries? What is that medium mentioned by Mr. Millar in a short paper on "Mounting Insects" in the addenda to "Hogg's History of the Microscope" (fifth edit.), as having, he believes, been discovered by the Rev. J. Thornton, which will destroy the animal tissues, soften the chitine, and combine with turpentine—potassæ and acetic acid (the solvents commonly used) being so inconvenient in consequence of producing milkiness, and thereby destroying the insect unless very carefully soaked in turpentine?—*J. W. G., 25, Charlotte Street, Bedford Square.*

Cromlechs.—I don't think it likely that Mr. Allen would consider the Welsh cromlechs had ever been the habitation of a race of giants. They certainly far more resemble in character sepulchral monuments, and it is more than probable that the Ancient Britons obtained the knowledge of their construction from the Egyptians and Phœnicians. There were, a few years ago, over twenty cromlechs in the island of Anglesea alone; but the only tradition I ever heard of giant or giantess in that locality was a legend current amongst the Welsh people that the body of a woman sixteen feet long lies buried across a path leading to the church door in the village of Llanedwen. That these cromlechs were ever altars for druidical sacrifices seems to those who have seen them utterly impossible; and as to their having been places of worship, the idea is still more untenable—the space beneath many of them being so small that a moderate-sized man could scarcely have crept into them. Then they are mostly erected on carnedds, or heaps of loose stones—a most uncomfortable place for the performance of devotional exercises.—*Helen E. Watney.*

Polarizing Prisms.—I believe it is generally understood by microscopists that, having placed the polarizing prisms in the microscope with a selanite slide, all the possible changes of tint are procurable by merely revolving the *lower* prism. This, however, is not a fact, a varied adjustment of the *upper* prism being absolutely essential in order to produce certain colours. For instance, I have a disc of selanite which in one position of the prisms gives a blue and a yellow, while in another position of the *upper* prism a green and a pink are produced when the lower prism is revolved. Of course there are intermediate shades in both cases, but in the first instance no green or pink can be possibly obtained by the revolution of the lower prism, nor in the second case can yellow and blue be produced. For want of a knowledge of this fact, I have known friends set lightly by slides of great beauty and interest. I wish I was able to assign a cause for this; as yet I have been unsuccessful, but hope some of your scientific correspondents will supply this information, and give specific directions for the relative positions of the prisms in such cases, so as to produce the maximum effect, which sometimes is found with difficulty.—*A. N.*

Storm Glass.—In your January number I observe a query on this subject which was not answered. There are several receipts in print. Take a long Eau de Cologne or similar bottle; half fill it with spirits of wine; take two drachms of powdered camphor, half a drachm of purified nitre, and half a drachm of muriate of ammonia; rub them together in a mortar; put them into the bottle or tube, and let it stand till the camphor is dissolved, gently

shaking it occasionally; then add water (distilled, or which has been boiled) till you have (after subsidence) about an inch of sediment; do this gradually, and add water almost by drops till the proper proportions seem to be established. After each little addition of water, let it stand till settled.—*T. H.*

Hailstorm.—On February 22nd, about 6.30 p.m., this place was visited by a violent hailstorm, during the continuance of which, only five minutes, some very large hailstones fell. One which was measured by my mother was pear-shaped, an inch and a quarter long, three-quarters of an inch broad, and two inches and a quarter in circumference. All the hail that fell was very hard, and it fell so rapidly that in a few minutes the ground was quite covered. The storm was accompanied by thunder and lightning. Were other districts visited in like manner? —*Rev. J. L. Langdon Fulford, Woodbury, near Exeter.*

Adhémar's Theory.—In *All the Year Round* for April 21, 1860, may be found a popular exposition of the theory of Periodical Deluges, as propounded by Alphonse Joseph Adhémar, author of "Revolution de la Mer."—*E. N. W., Melksham.*

"What's in a Name?"—The origin of one of the most popular names by which a monkey is known when tamed and introduced into civilized society—that of "Jocko"—may be traced as follows. I take the facts from a lecture delivered by Professor Huxley many years ago. In the early part of the seventeenth century, one Andrew Battell, of Leigh, Essex, spent eighteen years on the coast of Western Africa, and during that time made many curious observations on the natural productions of that part of the world, which he published on his return to England. In his book occurs the following sentence: "Here are two kinds of monsters (apes), which are common in the woods. . . . The lesser is called 'Enjeco.'" Battell's work was translated into French in the year 1748, by the Abbé Prevost, and was thus brought under the notice of Buffon. The great naturalist incorporated the account of the West African apes in his well-known History of Animals, adding in a note, "'Jocko, Enjocko,' nom de cet animal à Congo, que nous avons adopté." Thus it came to pass that Andrew Battell's "Enjoco," which is in fact identical with the chimpanzee or encheeko of the natives, was metamorphosed into "Jocko," and in the latter shape was spread all over the world, in consequence of the extensive popularity of Buffon's works!—*W. W. Spicer, Clifton.*

Hybernation of the Toad.—I should assume with "F. F." that toads have never been found hybernating in the mud at the bottoms of ponds and ditches, as is asserted by some people, but they are very frequently found either partially or completely imbedded in the earth under stones, bricks, &c., in some secluded spot. I have met with them in great numbers when turning up the roots of strawberry plants, and also when digging close to a garden wall. They generally appear to select the most out-of-the-way hiding-places for the winter season, being sometimes found in the most unimaginable situations. Moreover, there are never any external signs whatever to indicate the particular locality which they inhabit. It is also often wondered where the small frogs seen occasionally after a shower come from; in fact, many people venture to assert that they descend with the rain, but it can be proved they are merely brought out from the nooks and crevices in which they have been hitherto secreted by the genial influence which moisture has upon them. It is but seldom that any of the reptiles can be seen in the winter months, unless they are accidentally disturbed in their state of torpor.—*J. H. F., Harleston.*

Hybernation of Frogs.—I have kept several for years. One year two of them buried themselves in a mound of earth; others hid under a heap of wood, where they have taken up their winter quarters ever since. I have seen toads hidden between the palings and a post, seen them turned out of a potato clamp, under loose stones—in fact, anywhere that they can find shelter; they do not seem at all particular. My frogs always remain at the bottom of the pond during the winter. They seem very fond of change of abode during the warmer months; some of mine pay my neighbours a visit now and then, although they have to scale a wall nearly 7 feet high.—*G. Bullard, South Hackney.*

Hybrid Pheasant.—The following is from Montagu's Dictionary of British Birds. The Rev. George Herbert informs us that the hen pheasant often assumes the plumage of the male; and to prove that it is not an effect of age, a clutch of eggs were hatched under a domestic hen, and one of the young females assumed the male plumage in autumn at the usual time when the sexual feathers appear. A female Painted Pheasant (*Phasianus pictus*) bred in the menagerie of the late Lord Carnarvon at Highclere, became male-feathered. The bird was six years old, and had produced some broods, but for the last two years had not bred; in the spring of the year in which she became barren, or did not lay any more eggs, visible marks of change to the male plumage began to appear. The tail and other coloured feathers were evident marks of this strange assumption of plumage. No additional marks were noticed in the spring, but her autumnal plumage of that year was perfected before her decease on December 10th, 1803. In this state of change, which appears to have been progressive, there are evident marks of her sex, especially on the back and rump, which had not attained their full yellow, nor the narrow long crimson coverts of the tail; but the beautiful yellow silky crest, and the orange hood on the hind part of the head, composed of long truncated feathers, with their tips barred with purple, that fall on the neck, are as perfect as in the male. From these and many other accounts it is quite clear that it has nothing to do with age.—*E. G. W.*

An Early Season.—In our locality we have this winter almost escaped the notice of King Frost. Old inhabitants say that they don't recollect so mild a winter; and there is every prospect of an early botanical season, provided the icy monarch does not give us a parting nip. Already the plants I have noted in flower are much in advance of the usual time of æstivation. *Cochlearia officinalis* I found on 29th February; but, more remarkable still, the wild thyme, *Thymus serpyllum*, was coming into bloom in considerable quantity at the same time and place. *Barbarea vulgaris* and *Fragaria vesca* flowered on the 14th March. These are not the only instances. In every case, as far as I have noticed, we are ahead of former years.—*S. A. S., Belfast.*

Novel Mousetrap (p. 65).—H. Tasker may like to know that not only are hens partial to mice, but the same *penchant* is shared by tame pheasants. I was informed the other day that ours had been seen, in a state of great excitement, chasing one; whether it was at last captured, I do not know.—*B.*

Novel Mousetrap (p. 65).—In reply to H. Tasker's inquiry, it is a common occurrence for hens to catch mice, especially field-mice, which are generally plentiful in old orchards around farm-houses. Guineafowls, too, are most excellent mousers. Whilst on the subject of hens, I may mention that at the present time we have two that are curiously deformed: one is "underhung"—the lower mandible projecting considerably beyond the upper one; the other has its mandibles crossed like those of the crossbill. Neither of them seem to be the least inconvenienced in eating.—*Robert Holland.*

Viper Bites.—With all due deference to Mrs. Watney's opinion relative to snake bites, I must ignore the idea of their proving fatal as a primary cause. Having passed many years of my life in various parts of the country, and thus become aware of some few instances of snake-bite, I do not hesitate to say that I never knew of one proving fatal; I have heard and read of such things, but, like ghost-seeing, coming second-hand, I said, as I say now, I doubt. That death might ensue as a secondary cause, I am open to conviction—that is, when the system is very much debilitated or diseased, mentally or physically. When in that state, a very slight matter will suffice to bring about a fatal result, just as a very slight blow would do. Unfortunately, cause and effect are so blended in most minds, that the one is mistaken for the other. —*G. Bullard.*

Indelible Ink for Labels.—Any one who has attempted to preserve objects of interest in natural history in fluid, must have experienced the want of a good black ink which would neither be affected by time nor by prolonged immersion in fluids. Writing executed with ordinary inks will run and smear if the paper be wetted; but immersion in running water for nine days has failed to alter writing executed with ink made with the "Essence of Ink" recently introduced by Messrs. Perry & Co., of London. Even oxalic and other acids fail to remove it from the paper. To scientific travellers and others in foreign countries it is hardly possible to over-estimate its value, as it is a powder of extremely small bulk, and readily dissolves in water, a few moments sufficing to produce good ink ready for use. It is also very economical, a penny packet sufficing for three ounces, or six tablespoonfuls of very good ink, or four ounces of ordinary quality. Of course the ink must be allowed to dry on the paper before experimenting with water or acids.—*Charles Adcock, M.R.C.S., Birmingham.*

Early Spring.—In your last number "C. S. B. G." records having found frog spawn on 9th February. When walking through a garden on 20th February, I observed a wasp flying about almost as briskly as if it had been June. A gardener to whom I mentioned this confirmed it, he having observed the same thing a few days later. These wasps would very likely be on the same errand as that one so charmingly described in the "Episodes of Insect Life" (First Series, p. 214–19), though rather earlier afoot. About the same time I observed one of the common garden fuchsias bursting into leaf. A friend likewise told me of his having gathered March violets and seen a lively toad near the beginning of February. I mentioned these facts to several parties in this neighbourhood who have for years been in the habit of observing nature, and while confirming them, they informed me they had never seen an earlier season than this.—*B., Ayr.*

Death of Tits.—I have had at different times three specimens of the common titmouse, and all died suddenly during the second night after they came into my possession—falling off their perches while asleep, and being dead before I could cross the room. They were the day before apparently in good health, and had hemp-seed, canary-seed, and rape for food. I should be obliged for any hints for preventing it again.—*E. G. Wheler, Proseken, near Wiemar, Mecklenburg-Schwerin.*

Death of Mr. E. Tucker.—The public journals announce the death of Mr. E. Tucker, of Margate, whose name is associated with the Grape Mildew (*Oidium Tuckeri*), which he was the first to discover, and was named in his honour.

Black-tailed Godwit.—In the winter of the year before last, in the month of January, a very fine specimen of the Black-tailed Godwit (*Limosa Melanura*) weighing fully a pound, was brought to me by a person who shot it out of a flock of about two dozen, flying over a bog. I believe it is now a very uncommon bird.—*W. B., Bruff, Limerick.*

Rare Birds.—Three rare birds have lately visited the county of Essex as under:—a Great Northern Diver was shot on the lake of Braxted Park; a Bittern shot on Ramsey Island, and also a Californian Quail (*Ortyx Californica*), of very rare occurrence, distinguished by a crest on the head of two or three feathers curled forwards.—*G. Day.*

New Zealand Laurel.—In the rectory grounds, Pickworth, near Falkingham, Lincolnshire, there were (in 1865) several of the fruit-bearing laurels (*Corynocarpus lævigatus*), as mentioned by your correspondent "G. N." Having heard that the gipsies were fond of the fruit, I ventured to taste one, a purple fleshy roundish plum, smooth skin; it was decidedly sweet. The trees were from ten to twelve feet high, of large open growth.—*J. B. B.*

Watercress.—I am very fond of watercresses, but cannot enjoy them for the following reason. Whatever I drink *throughout the day*, afterwards—beer, wine, or what not—tastes so strongly of sandal-wood in the mouth as to be quite nauseous. My wife experiences the same. Has any one of your readers found the same effects on eating watercress, and can it be accounted for? Is there any antidote or after-remedy?—*W. E. H.*

Humble Bee.—On March 9, whilst walking on Stourbridge Common, I saw a humble bee. Is not this very early? Also, it was very lousy, and quite unable to fly. Also, on March 13, I saw in Trinity College grounds a small tortoiseshell butterfly (*Vanessa urticæ*), which is earlier than I remember to have seen it before.—*A. H.*

NOTICES TO CORRESPONDENTS.

E. A. W.—The fossils are *Avicula echinata*, Sowerby, Cornbrash Kidlington, Oxon, and *Pecten arcuatus*, Sowerby, Great Oolite, near Great Barford, Oxon.—*H. W.*

C. P. C.—The fungus is *Polyporus adustus*.—Fr.

J. R.—No. 3 is *Anthrocera filipendulæ*. The rest we would not attempt to name from such fragments.

Paul and X. Z. are reminded that all anonymous communications are at once consigned to the waste paper basket.

E. H.—Your beetle is *Hylesinus crenatus* (Fab.), a wood-feeder often destructive to ash trees, and abundant where it occurs, but not generally common.—*E. C. R.*

A. A.—We never experimented on the flight of bees.

W. N.—The American Naturalist is 1s. 6d., and may be had of Trübner & Co., Paternoster Row.

H. C.—Not a question of an eligible character.

J. C. C.—Our advice is, read De Quincey's "Confessions of an English Opium Eater," and leave experiments alone.

J. W. G.—To preserve fungi, see "British Fungi," published by R. Hardwicke. The Diatomaceous earths may be had on application to the Editor, enclosing four good mounted objects.

L. H. F.—The "flea cage" was made to order.

G. R. R.—The Fairy Shrimp is almost always to be found in a dirty little pond on Blackheath.

M. C. P.—Inquire of Mr. W. Pamplin, Llanderfel, near Corwen, Merionethshire.

Traces on the Giants.—We have received several communications on this subject, but from our experience of the Unity Controversy must be excused if we decline to permit another, and hope that our correspondent F. A. A. will quit such controversial topics.

W. F.—We do not regard Autographs as objects of Natural History,

F. S.—The moth is "The Herald," *Scoliopteryx libatrix*.

G. (*Helston*).—We cannot reprint the six or seven pages of Dr. Herepath's description of his process of manufacturing his crystals of Herepathite; our correspondent must consult the 2nd volume of the "Journal of Microscopical Science," p. 83.

E. J. R.—We do not insert books in our Exchange column.

W. C. J. F.—It is a mistake, as mentioned in our notice.

M. G. F.—Much depends upon taste; cardboard boxes with glass tops are now much used. The shells are placed upon wadding. Wash your "mouldy" shells.

R. V. T.—The moss is *Bartramia pomiformis*.—*R. B.*

W. A.—No. 1. *Dicranella varia*. 2. *Pottia truncata*. 3. *Tortula unguiculata*. 4. *Hypnum rutabulum*.—*R. B.*

J. F.—We do not know the address. All artists are not naturalists or astronomers. We do not see that your criticism is correct.

O. P.—We can see disadvantages in your tin forceps, and no advantages, not even cheapness. You are wrong in "from one to three shillings" being the price of common brass forceps. Acari are found in other than *damaged* brown sugar by those who use their eyes.

A. L. L.—We should think it much more probable that if the story were traced to its source, it would be found to be a "gull for gullible people."

A. A. A.—Do you know "Bechstein's Cage Birds," or "Beeton's Home Pets"? Fortune's "Tea Districts of China" is perhaps what you require, or Porter's "Tropical Agriculturist."

Seaweeds (name and address mislaid).—No. 1. *Batrachospermum* (early stage?). No. 3. *Gemellaria loriculata* (a zoophyte).—No 4. *Polysiphonia elongata* (spring condition).—*W. H. G.*

W. H. G.—Not uncommon. It is a caulescent form of the common primrose.

T. P. B.—Your toad story requires, what so many of these reports require, strict investigation before publication. It can do no good to add another without unimpeachable proofs of veracity.

R. M. B.—"Ootheca Wolleyana" is published by Van Voorst (coloured). Part I., Royal 8vo., 31s. 6d. The only complete work on British Mosses is Wilson's Bryologia Britannica (coloured). Price four guineas (Longmans), but this requires revision.

T. H. H.—The moths are (no numbers) *Xylophasia rurea*, var. *combusta*, and *Hadena Pisi*.—*H. G. K.*

K. W.—In "Our Reptiles," published by R. Hardwicke, 192, Piccadilly, price 6s.

EXCHANGES.

Cuticle of American Prairie Grass, *Gynerium argenteum*, for stamped envelope. J. P., Abbotsbury, Dorchester.

American Deposits, Perley's Meadow, Duck Pond, and French's Pond, Maine, U.S., in exchange for good mounted objects.—E. C. B., care of the Editor.

Coal, containing vegetable structure, wanted for good mounted objects.—B. B., care of the Editor.

Bone of Stonesfield Slate Pterodactyl, wanted for good mounted objects.—J. B., care of the Editor.

Diatoms.—*Melosira procera*, Toome Bridge earth, and *Navicula amphisbæna*, for other good species.—Thomas Stow, Wycombe, Melton Mowbray.

Mosses.—*Hypnum flagellare*, for other good species.—J. Bowman, Cockan, Lamplugh, Cockermouth.

Elephant's Tooth, a piece for sections, offered for mounted objects of diatomaceous earth.—Obed Poole, Uphill, Weston-super-Mare.

Fossils from the Chalk offered for oolitic fossils.—J. Wood, 15, City Road, Finsbury, London, E.C.

Injected Preparations for any objects of interest, particularly entomological.—Dr. Harvey Betts, Madeira Road, Ventnor.

Teeth of Blue Shark for British Lepidoptera or good British land and freshwater shells.—T. H. Hedworth Dunston, Gateshead.

Insects' Eggs (named) wanted for rearing. British seeds for microscope offered in exchange.—W. H. G., Vernon Cottage, Thornhill Road, N.

Botanical Specimens (mounted) wanted in exchange for blood discs of Salamander.—G. D., 36, Chapel Street, Pentonville, N.

Entozoa.—Echinococci from hydatid cyst in brain of sheep (unmounted) for other unmounted objects.—Wm. Youdale, Cockermouth.

Foraminifera from river sand at March (mounted), for any good object.—J. Buckle, Tonbridge.

Molluscan Tongues, rare and common, mounted or unmounted, for other good microscopic objects.—F. W., Belvidere Villa, Tenby.

Plants, dried and mounted, chiefly from Cambridgeshire, including several rare specimens, for good fossils on microscopic apparatus.—H. L., 18, Harbourne Road, Birmingham.

British Lepidoptera and Coleoptera, a collection wanted in exchange for one of North American species.—Address, in the first instance, J. Burton, 56, Portland Road, Nottingham.

Eggs of Bombyx Cynthia (Japanese silk-moth), in exchange for British Lepidoptera or Pupæ of Butterflies.—Address, A. Z., 69, Sutherland Street, Pimlico.

BOOKS RECEIVED.

"The Naturalist's Circular." No. 22, March, 1868. H. Hall.

"Handy Book for the Flower Garden," by David Thomson, gardener to Lady Mary Claude Nisbet Hamilton, &c., 8vo., pp. 364.—London: Blackwood & Sons.

"Half Hours with the Telescope," being a popular guide to the use of the Telescope as a means of amusement and instruction, by Richard A. Proctor, B.A., F.R.A.S., with illustrations on stone and wood, 12mo., pp. 109. London: Robert Hardwicke.

"Notes on the History, Methods, and Technological Importance of Descriptive Geometry," by Alexander W. Cunningham, 8vo., pp. 58. Edinburgh: Edmonston & Douglas.

"A Plea for Birds," by the Rev. J. Pemberton Bartlett, 24mo., pp. 55. London: Society for Promoting Christian Knowledge.

"Proceedings of the Essex Institute." Vol. V., No. 5, January to March, 1867. Salem: Essex Institute, Mass., U.S.

"The American Naturalist." No. 12. Salem: Essex Institute, Mass., U.S.

"Proceedings of the Bristol Naturalist's Society," February, 1868. Bristol: Printed for the Society.

"Country Life." Nos. 30, 31, 32.

Communications Received.—T. W. W.—W. W. S.—E. H. —E. V. W.—T. H.—A. N.—G. G.—E. C. R.—H. E. W.—R. B. S.—G. J. E.—J. R.—B.—M. G. F.—F. T. M.—W. C. J. F.—F. K.—G. B.—E. J. R.—F. N. A. S.—M. C. P.—S. J. B.—T. S.—B. T.—W. A.—G.—R. B.—G. R. R.—F. S.—M. P.—L. H. F.—T. W. W.—C. O. G. N.—J. L. L. F.—T. P. —J. W. G.—E. F. B.—J. C. C.—G. D.—B (Melle).—H. C.—J. J. J.—J. B. W.—W. N.—T. R.—F. A. A.—S. S.—T. P.—L. T.—A. A.—S. A. S.—W. H. C.—R. V. T.—J. P.—W. F.—C. E. D.—L. P.—J. C.—J. B.—G. G.—J. F. T.—H. E.—J. A. —A. L. L. C.—O. P.—T. P. B.—L. G. M.—E. G. W.—G. B.—A. A. A.—W. B.—W. P.—J. W.—F. F.—J. H. F.—T. B.—C. A.—W. H. G.—W. E.—S. A. S.—G. H. B.—J. W.—T. S. —M. B.—W. Y.—R. M. B.—J. B. B.—G. D.—J. B.—F. W.—H. L.—W. D.—J. A. C.—J. S. T.—T. C.—A. L.

FORGET-ME-NOTS.

The blue and bright-eyed flow'ret of the brook,
Hope's gentle gem, the sweet "Forget-me-not."

THERE are, among the names of our British plants, a few which are claimed with apparently equal right by widely differing species; *e. g.*, a genus of the *Umbelliferæ* (*Œnanthe*) bears the English name of Dropwort, which is also applied to *Spiræa filipendula*, one of the *Rosaceæ*. It would, however, be difficult to find a name which has had more claimants than that of "Forget-me-not." Nowadays, indeed, it seems to have been settled upon the lovely blue *Myosotis* which decks the borders of our ditches and streams, and many, doubtless, know of no other plant to which it is, or has been, applied. But, strange as it may seem, Dr. Prior, a well-known authority on the names of plants, states that *Myosotis palustris* has only been known as Forget-me not for about forty years! We can hardly imagine the successful transfer of a popular name from one plant to another: scientific men change about the names of species and genera at their own sweet will, and outsiders care little whether the American Waterweed be known as *Elodea canadensis*, *Anacharis Alsinastrum*, or, to quote Charles Kingsley, *Babingtonia diabolica;* but for a genuine English name to change owners is a very rare occurrence. A few remarks on the Forget-me-nots of various authors may not be out of place. In England the Ground Pine (*Ajuga Chamæpitys*) was probably its first claimant, and Gerarde bestows the name exclusively upon it. Why an insignificant little herb, with small inconspicuous flowers, should be selected to bear so romantic a name seems, at first sight, difficult to imagine; but the nauseous taste which it leaves in the mouth is the somewhat farfetched reason assigned. Referring again to Dr. Prior's book, it appears that in Germany a similar name was bestowed on a species of Woodsage (*Teucrium Botrys*), and in Denmark on the Germander Speedwell (*Veronica Chamædrys*), in connection with which we have previously referred to it.* Dr. Prior, after investigating the claims of these rivals, says, "This (the Germander Speedwell) seems to be the plant to which the name rightfully belongs, and to which it was given in consequence of the blossoms falling off and flying away." He adds: "How easily a good story is got up, and widely spread about the world, to match a name! The blossoms fall from a *Veronica*, and it is called 'Speedwell' and 'Forget-me-not.' The name passes to a plant of nauseous taste, the Ground Pine, and Daleschamp explains it as expressive of this disagreeable quality. It attaches itself to a river-side plant, and the story-books are ready with a legend." With this legend we are all familiar: how "two young lovers" were walking by a stream; how the young lady (as young ladies will) demanded, as proof of her lover's affection, a bunch of the bright blue blossoms which grew (where, by the way, they usually *do* grow) on the other side; how the youth plunged into the river, grasped the flowers, and, the current being too strong for him was carried away, with one last effort throwing the fatal blossoms to the bank, and crying with his "latest breath," "Forget-me-not!" How sad to hear it even hinted that so touching a tale was coined by some ingenious romancist to account for the name previously bestowed. One thing, however, is certain: the Forget-me-not of modern times

* SCIENCE-GOSSIP, ii. 122.

is indisputably *Myosotis palustris;* needing no "nauseous taste" or fleeting blossom to account for the name to which its beauty entitles it.

The genus *Myosotis* belongs to the Borage tribe (*Boraginaceæ*), an order which contains some of our most beautiful wild flowers: the general features of which are entire, hairy (often bristly) leaves, and large *monopetalous* (*i. e.* all in one piece) corollas, which are usually of some shade of blue. How many species of *Myosotis* are found in Britain greatly depends upon our estimate of the marks necessary to the definition of a "species." Gerarde knew of but two, *M. palustris* and *M. arvensis;* and Withering, in his 'Arrangement' (ed. iv., published 1801), admits of no more. Most modern botanists, however, enumerate eight, though Mr. Bentham recognises but five, and seems to intimate that even one of these may not be really distinct. Babington says that the genus is distinguished from all other genera of Boraginaceous plants by its "*convolute corolla*"—that is, by the corolla, when in bud, being twisted together lengthwise. All our British species are small plants, with narrow, entire, mostly hairy leaves, and bright blue *rotate* (or wheel-shaped) five-cleft corollas. The Forget-me-not may be taken as a type of the genus; and if we keep this constantly before us, we shall not be likely to go far wrong in our search for the other species.

Taking the more general estimate as correct, we will follow Professor Babington's division of the eight species into two groups: the first comprising six species, in which the corolla is *persistent*, that is, does not easily fall off; and the second, the remaining two, in which the corolla is *fugacious*, soon dropping off.

I. PERSISTENT.—This section we may, for convenience, subdivide into two groups: the first, of three species, growing in damp places, which we may call Forget-me-nots; the second, of an equal number, frequenting dry ground, known as Scorpion-Grasses.

1. *The Forget-me-nots.*—Our true Forget-me-not claims first consideration, and surely needs but little description: so generally known and admired is it, both by poet and lover, the one celebrating the "sweet Forget-me-nots which blow" for the other. Mr. Bentham calls it the Water Myosote, a name pretty enough in itself, but by no means *English*. The old appellation for this, as for all the members of the genus, is Scorpion-Grass; because, to quote our old friend Gerarde, "the whole branch of floures doe turne themselves round like the Scorpions taile." He classes it with a curious plant (a species of *Trigonella* ?), the twisted pods of which suggested the same name. Our old herbalists, we are well aware, often acted on the principle "like cures like;" and here we have an instance of it. "Dioscorides saith that the leaves of Scorpion grasse applyed to the place is a present remedy against the stinging of Scorpions, and likewise boyled in wine and drunke, prevaileth against the said bitings, as also of adders, snakes, and such venomous beasts." This curious curling or twisting of the flower-spikes is eminently characteristic of many of the *Boraginaceæ*. The leaves of the Forget-me-not are nearly smooth, occasionally slightly hairy, and the stem angular: the "floures grow at the top of tender fat greene stalkes, blew of colour, and sometimes with a spot of yellow among the blew." It is *impossible* for any observer to mistake *M. palustris* for any other plant; its place of growth and large blue flowers at once distinguish it. The Brooklime (*Veronica Beccabunga*) is occasionally miscalled Forget-me-not; but its small *four-cleft* corolla at once determines it, to say nothing of other peculiarities.* The Forget-me-not blossoms from the end of May until September, and is very common by streams; we have seen such masses of its turquoise flowers in the little creeks which here and there branch off from the Thames about Great Marlow, that one might think a tiny piece of blue sky had fallen down, and settled upon the herbage. Looking over a pleasant little book† the other day, we saw it stated that "botanists speak of the true Forget-me-not as rare;" but this remark is not "founded on fact."—Our next species is the Creeping Forget-me-not (*M. repens*). This is much like its "big brother" *M. palustris*, but has smaller flowers. Babington directs attention to the fact that the calyx is divided "fully half-way down," while in *M. palustris* it is divided "about one-third down;" a minute difference it may seem to some, but, if constant, a sufficient one. The stem is creeping, rooting at the base, but this is almost equally the case in *M. palustris*. We may observe that the leaves of this species are more hairy than those of the Forget-me-not; the raceme is "slightly leafy below," and the flowers are intermediate in size between those of *M. palustris* and those of the next species. Although recorded from many localities, the Creeping Forget-me-not is not a very common plant.—The Small Forget-me-not (*M. cæspitosa*) is also called the Tufted Scorpion-Grass, in reference to its Latin name, which does not seem particularly appropriate. This is a frequent plant of boggy and watery places, and is easily distinguishable: the blossoms are small, light blue with a yellow eye, as in *M. palustris:* the leaves and stems are of a paler green, and the latter much more slender than those of either of the preceding. It is, indeed, altogether a smaller species, of very erect habit, blossoming from June until September. Mr. Bentham says that *M. palustris* is more common in the south of England, *M. cæspitosa* in the north: "but

* See SCIENCE-GOSSIP, ii. 123.

† The Everyday Book of Natural History.

they all three run so much one into another as not to be distinguishable with certainty even as varieties." *M. cæspitosa* is, however, common enough in most districts, and when seen growing with *M. palustris*, seems sufficiently distinct from it.

2. *The Scorpion-Grasses.*—Happy must be the botanist who has found on the Breadalbane Mountains, or in favoured Teesdale, the Rock Scorpion-Grass (*M. alpestris*). Even in scientific books it receives a tribute of admiration: Babington speaks of it as having "large, handsome blue flowers, sweet-scented in the evening." Another writer says that they "grow at first in such dense clusters as almost to form heads, though they afterwards become racemed." The extreme rarity of this species adds to its interest, for the preceding localities are all that have been recorded for it. Mr. Bentham unites it with *M. sylvatica;* but Mr. Watson says, "I cannot say that the cultivation of it for a few years in my garden has much tended to convince me of the accuracy of this view." (*Cybele*, ii. 272-3.)—The Wood Scorpion-Grass (*M. sylvatica*) is another lovely plant, found in woods in the north, and more rarely in the south of England. Merrett notices it in 1667, and Ray gives a very good figure in the 'Synopsis' (1724); but Withering refers Ray's figure to *M. arvensis* "when growing in a damp and shaded situation." There can be little doubt, however, that the true *M. sylvatica* was known to the earlier writers named. Gardeners have lately employed the Wood Scorpion-Grass with great effect in the "spring gardening" which has now attained such perfection at Cliefden and elsewhere. In small gardens it is a most useful plant, blossoming freely from April until June, if the earlier flower-stems be clipped when past blooming: it increases very rapidly by offshoots, and, when permitted, seeds abundantly. It is a good plan to preserve the young seedlings for the next year's planting out: the old plants, where space is an object, can then be thrown away. The leaves of the Wood Scorpion-Grass are longer and broader than those of *M. palustris*, and are very hairy; the blossoms are large, of a brilliant blue. The pretty little *Omphalodes verna*, which has almost heart-shaped leaves, creeping scions, and fewer though more brilliant flowers, is sometimes miscalled a *Myosotis;* the blossoms bearing a general resemblance to those of this genus.—The species which we have hitherto considered are *perennials:* our next is an *annual* or *biennial* plant,—the Mouse-ear Scorpion-Grass (*M. arvensis*). This is, next to the Forget-me-not, the best-known species, and to it all the land Scorpion-Grasses were formerly referred. It grows in fields and by roadsides, usually in dry, but sometimes in damp places. The flowers are a miniature likeness of those of *M. palustris;* the leaves and stems are very soft and hairy; the former gave rise to the English name of the species, and the Latin one of the genus, *Myosotis* being derived from two Greek words, signifying a mouse's ear. *M. arvensis* is a very variable plant, in damp, shady places attaining a considerable height, and having larger flowers: this form, called by botanists *β. umbrosa*, is occasionally mistaken for the Wood Scorpion-Grass by those unacquainted with that plant. The Mouse-ear Scorpion-Grass begins to blossom about the middle of April, and continues in flower until the end of June.

II. Fugacious.—Annual plants. The Early Scorpion-Grass (*M. collina*) is a pretty though not very common species, growing on dry banks, walls, and the roofs of cottages. It is not often that the colour of a flower is considered of sufficient importance to be relied on in distinguishing one species from another; but we may remark its value in connection with *Myosotis collina.* In most, if not all, of the species in our first section, the buds are more or less tinged with pink; indeed, in *M. palustris* and *M. arvensis* the newly-expanded flowers are often entirely pink. In *M. versicolor* (which we have yet to consider) the blossoms, when first open, are yellow; but in *M. collina* they are "*unchangeably* blue," and of a darker shade than those of our other species. The Early Scorpion-Grass may possibly be confounded with *M. arvensis*, from which Mr. Bentham hints that it may not be specifically distinct; but its small size, darker and smaller flowers, and earlier appearance, will help to distinguish it. It is usually past blossoming, and, in dry situations, burnt up altogether, by the time that the blossoms of *M. arvensis* become conspicuous. When the flowers first open, they appear as though in small round clusters, so embedded are they in the soft, hairy leaves; but in due time they lengthen into slender one-sided racemes, when we shall notice that one flower grows by itself in the axil of the uppermost leaf.—The Particoloured Scorpion-Grass (*M. versicolor*) is not uncommon in a variety of situations,—on dry banks and walls, or in damp meadows. It is larger than the preceding, and may be known from it, as from any other British species, by its blossoms, which, when they first expand, are white or yellow, frequently (though not always) becoming blue before they fall off. Like *M. sylvatica*, this species was known to Merrett and Ray: Withering seems to regard it as a form of *M. arvensis*, and places it under that plant, observing that "in dry situations the blue border of the blossom is very small, and sometimes is scarcely expanded at all, so that the blossom appears yellow." Miss Pratt says that she has seen it with *crimson* flowers. The calyx is usually of a purplish hue. The blossoms expand in May, and the plant, when growing in dry places, is frequently withered up by the end of June; in damp meadows, however, it attains greater luxuriance, and lasts somewhat longer.

With regard to the drying of the species of

Myosotis, we may remark that, while the Forget-me-nots usually turn brown or black, some of the Scorpion-Grasses retain their colour very satisfactorily. *M. sylvatica*, in particular, is quite a treat to contemplate in one's collection, as its large flowers lose but little of their brilliancy, and the green of the leaves retains a respectable share of its original hue. *M. collina*, too, and occasionally *M. arvensis*, present a moderately satisfactory appearance. B.

HEDGEHOG.

WHAT is a Hedgehog? Is there any such creature, with instincts and appetites befitting its place in creation? One will tell you, and many a one, that it feeds upon roots and fruit—has been seen carrying home apples and berries upon its spines. The anatomist bids you look at its jaws. It must be insectivorous. The enlightened farmer would designate it his best friend, devouring only insect vermin—slugs, beetles, grubs—in vast quantities. The benighted cowman loves to tell of injured teats that an old hedgehog has been at. The shrewd gamekeeper, of an old hedgehog that eludes *him;* he it is carries away his master's pheasants' eggs. In the midst of this conflict, a few observations, spread over some forty years, upon the habits of the creature, may possibly entertain your general reader, and even profit such as live by the culture of the field. I have had them under a variety of circumstances, and ages, from very birth; and as their instinct seemed little affected thereby, my remarks, for brevity sake, will principally refer to one brood as applicable to all. This, my last and longest kept, consisting of four, chanced to be born in the dining-room: the mother (quite wild) having been removed there, away from the insults of one to whom she had been proposed as a companion; and the surprise was great when the hand inserted for the mother felt and drew from her flag-basket a little tawny-white urchin, having about five rows of rather long but soft spines, altogether resembling (as a friend remarked) a tiny larded sweetbread. They showed neither ear nor eye externally, the ears protruding in three, the eyes not opening till thirteen days; still they obeyed the warnings the mother's low sonorous breathing conveyed to them, either by retreating to her, or rolling up into little balls. So peculiar is this ventriloquistic sound, and beautifully adapted, that doubtless it is taken by their enemies for the moaning of wind through the hedgerows. All, however, were not obedient alike; one, which in after-life turned out the genius of the family, preferred to linger in the warm hand; but his career, poor fellow, ended the most unhappily. Brown spines showed points on the fourth, and they were full spined on the eighth day. The growth is very rapid: in three weeks' time the four attained a weight of one pound six ounces and a half. At nine weeks all were attacked—the two males first, and most severely—with a disorder (or distemper) so violent as to cause imminent danger of suffocation, from the accretion of a greenish discharge; the claws, in which the first symptoms showed, ultimately coming away in a mass, and many of the spines. The parts were mopped with warm milk and water, with a drop or two of laudanum to allay pain. After being nursed through this, they became with me as familiar as kittens; even showing upon one or two occasions a slight indication to play with a feather or straw. Upon calling one of their names sharply, "Phil! Phil!" and starting a beetle unobserved, he would look hurriedly about him, and then hie away in pursuit. But so slow is their fussy pace, that too much law must not be allowed, or Mr. Bob may reach the wall and be safe. This same Phil had somehow taught himself to come and wave a grotesque little paw, when his exquisite nose apprised him of some delicacy on the table above, whether or no the room where they were nursed had any influence. But whilst being stowed in their own, they would use all their little cunning to creep past one's feet; and now and then one has succeeded in reaching this room, and rolling itself up in the end of the bed-curtain till all was dark, and still has astonished one with the heavy little trot, when I made sure I had counted them all through the chink. This faculty of packing is quite instinctive. A perfectly wild one having had a newspaper left him to lie upon, wrapped himself up into a parcel that would have done credit to a grocer's assistant. They will carry to their bed a large paper, or rag, without tumbling over the trailing corners, proceeding much as the ant (*Formica*) would do. It would have been interesting to see what a second generation might have exhibited, but it has since occurred to me that with this view a mistake was made in keeping the two males and two females together. There is a probability that some little families might have come to grief amongst them all. True it is, the next season, so determined were the females to avoid the persevering attentions of the males, that they were becoming lean and starved rather than encounter them at their food, and were therefore fed separately for a time. An opportunity was afforded for ascertaining their pace, by one whose habit it was to take a morning run of two hours among the chair-legs surrounding the room. This I measured and timed, and the average result was two miles—one mile per hour. This procedure caused no small astonishment, not to say trepidation, to the cats, who cautiously kept pace on the seats above, timidly putting down a pat occasionally. A Hedgehog will not budge an inch for a cat, but walk straight up to it, whereupon Puss summons her better part of valour. Like some other animals—cats, for that of

valerian, &c.—they have a passion for certain scents. Russia leather is one; chewing this, they anoint themselves as far as they can reach, and tumble about in a frantic manner. Here, doubtless, lies the mystery of carrying berries about; should such be present where these evolutions occur, they would be stuck upon the spines, and remain till brushed off by the next hedgerow. This chewing might also have given the impression that they were feeding on whatever root or berry furnished the scent. Hybernating is not imperative upon them. The first cold of October the brood experienced made them eat prodigiously, and in a very few days mother and all four urchins were sound asleep in the flag-basket. Here again showed another beautiful provision for their safety. Smelling powerfully (as at all other times they do) of musk, it ceased to be perceptible the instant this sleep came over them. Warm weather, however, coming on in November, and food being kept by them, they woke up, never to hybernate again. During their London life, the supply of insect food could not be kept up, however friends' kitchens might be kept under contribution. Here it is worthy of remark that much cruelty and lingering starvation is inflicted, under a notion that they can continue to catch beetles enough to satisfy their large appetites without further aid. The substitute of bread and milk, however well boiled, had a scouring effect; nay, passing, in colour and consistency, apparently unchanged, as if from absence of bile, the colour of which is bright blue. They seem incapable of digesting true vegetable matter; as the mole, whose teeth are very similar, some French naturalist has recently shown to be. As a corrective to this looseness, egg suggested itself; but every means of inducing them to eat it failed. This then seems to be no part of their natural food. The jaws, moreover, are very weak; a snail-shell fully grown exceeds their power, the quantities of empty shells observed in hedgerows being doubtless those of snails seized whilst crawling, and pulled thereout.

All this, together with the slow pace and the utter inability to make the slightest spring from the ground, makes it most improbable that either eggs or young poults of game are eaten by them. Although fond of the brown slug, the slime is most offensive. Their mode of getting rid of this before eating is so ingenious as to exhibit one of those approaches which instinct often makes to reason—*i.e.*, they roll it under their paw, as a cook works dough in making pastry, till the exudation is exhausted, and after all rub their chins most carefully; otherwise, it is very conceivable that a sudden alarm immediate upon such a meal might cause them not merely to roll up, but be glued together most inconveniently. This happened to a hedgehog recently caught, and therefore is purely natural. They had a fair perception of their distinctive names. Whilst in Herefordshire, a large antiquated garden was an Elysium to the last of my brood; nevertheless, she would come to her name—sometimes with a trot heard from the further end, at others so stealthily that a touch of the foot alone showed her presence—to be carried indoors and have warm bread and milk; and after burrowing awhile between coat and waistcoat (a favourite amusement with them), be turned out again.

There is a considerable variety in their vocal breathings, indicative of anger, affection, and so forth. One is continuous, analogous to purring. Any loud cry in the adult is exceedingly rare. It was never heard but twice, and that from the same individual: once from fright, or anger at getting his claws entangled in a cambric handkerchief (these claws, when there was no earth to dig in, were often obliged to be cut, an operation they submitted to very patiently); and once again from agony caused by an internal tumour, which quickly killed him. Looking up into my face, he uttered this piercing cry, came, got into, and laid him down in the proffered hand, saying, as plain as hedgehog could speak, "You gave me comfort in my distemper once; can't you do so now?" And so he died.

Now, these in offensive creatures, of all the useful denizens of the farm—be it quadruped, bird, or reptile—perhaps of the most unmixed good, are stupidly, superstitiously, and savagely exterminated wherever they can be met with.

GEORGE COX.

VEGETABLE HAIRS.

AMONG the many objects of interest which the vegetable kingdom offers to the microscopist, one of the most varied and the most universally distributed is to be found in what are called hairs, which clothe the surface of the leaves and flowers of a vast number of plants and trees. These hairs are appendages of and arising from the skin or epidermis; and although their simplest form is that of a single projecting and elongated cell, they are more generally composed of a series of cells, often bearing at the extremity a glandular protuberance containing the essential oil of the plant; and the variety of shapes which they assume appears to be almost unlimited, while the characteristics of many of them are so definitely marked, that, in the vast majority of cases, it would be quite possible to determine, if not the actual species, at least the order or family to which any specimen belonged, from the observation of a single hair. The hair of the Hop-plant, for instance, already figured in SCIENCE-GOSSIP, is so unlike most other vegetable hairs, that it would be impossible to mistake it.

The leaves and flowers of some plants possess two or three varieties of hairs, often in close prox-

imity to each other. The flower of the Snapdragon has single-celled hairs, some terminating in a globular gland, others in a cone-shaped gland. The garden verbena has some hairs like a flattened rosette on the top of a tall stalk, and others breaking out on all sides of their entire length in curiously knotted excrescences. The hair of the Marigold consists of a double layer of elongated

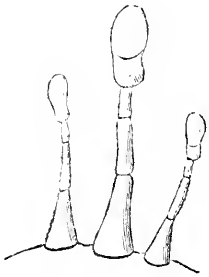


Fig. 75. Hair of Tobacco.

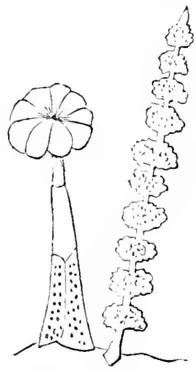


Fig. 76. Hairs of Verbena.

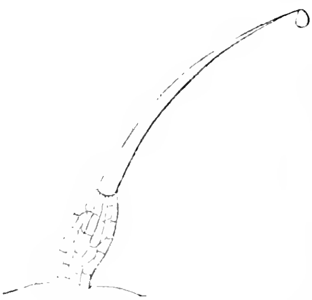


Fig. 77. Stinging Hair of Nettle.

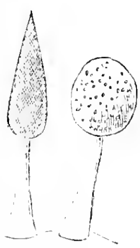


Fig. 78. Hairs of Snapdragon.


Fig. 79. Hair of Ivy.


Fig. 80. Hair of Hollyhock.

cells, built up one upon another, and lying closely side by side. The base of the hair of the common Stinging-nettle contains an irritating secretion, which flows through the straight tubular elongation till it reaches the little bulb-like swelling at the extremity of the hair. This is easily broken off when touched by any object, and the acrid fluid then escapes and produces the well-known sting.

Some hairs are forked or branched, like those of the Dandelion and the Plane-tree; others consist of a single elongated cell, like that of the Cabbage. In the hair of Marvel of Peru the elongation is

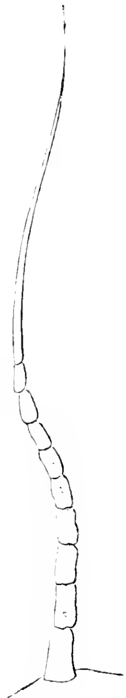


Fig. 81. Hair of Thistle.

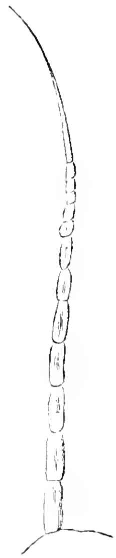


Fig. 82. Hair of Groundsel.

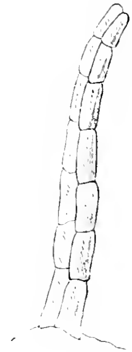


Fig. 83. Hair of Marigold.

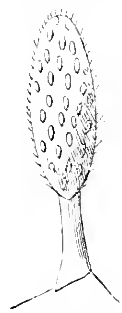


Fig. 84. Hair of Lobelia.

formed by a chain of cells placed end to end, and connected by slender threads. In the Thistle and


Fig. 85. Hair of Da delion.

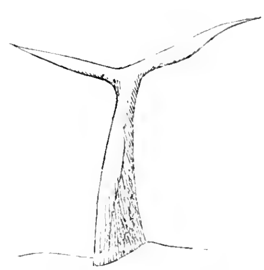


Fig. 86. Hair of Arabis.

the Groundsel, the last cell of the hair is lengthened out to a bristle-like extremity. On the leaves of some Geraniums may be found two kinds of hairs,

the one formed of a series of three elongated cells, the other a flattened disc-like form terminating a short stem of three or four cells. The branched hairs of the Lavender are also intermingled with others terminating in a glandular appendage which

Fig. 87. Hair of Moneywort.

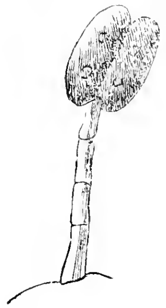


Fig. 88. Hair of Geum.

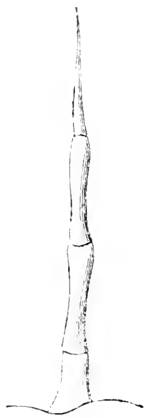


Fig. 89. Hair of Cactus.

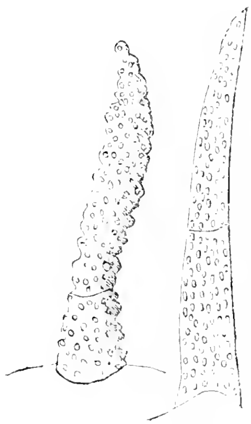


Fig. 90. Hairs of Dead Nettle.

Fig. 91. Hair of Cabbage.

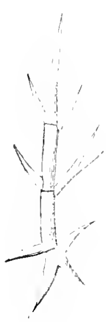


Fig. 92. Hair of Plane.

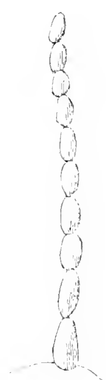


Fig. 93. Hair of Spiderwort.

contains the essential oil that gives to this plant its peculiar odour. On the petal of the Heartsease may be found three varieties of hairs. The hairs or spires of some of the cactus tribe are like a series of spear-heads placed one upon another. The Southernwood hair is composed of a chain of cells, of which the three lower form the stem of the hair while the two upper are lengthened into lateral branches. The leaves of the Chrysanthemum and

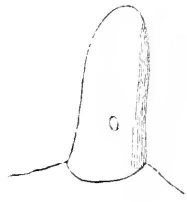


Fig. 94. Hair of Dock.

Fig. 95. Hair of Marvel of Peru.

Fig. 96. Hair of Cactus.

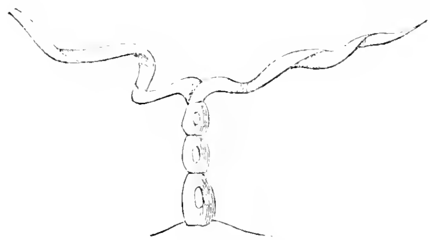


Fig. 97. Hair of Southernwood.

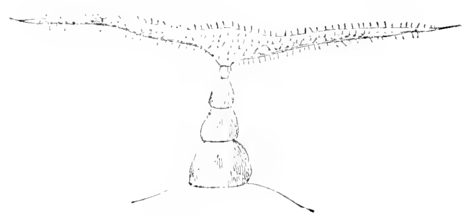


Fig. 98. Hair of Chrysanthemum.

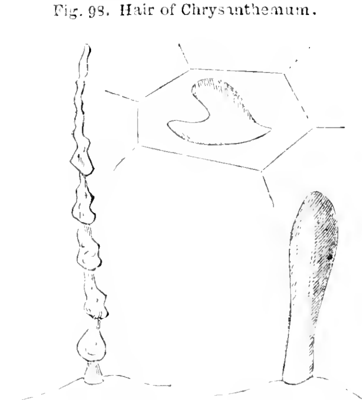


Fig. 99. Hairs of Heartsease.

the Wallflower also bear T-shaped hairs, the former springing from a series of cells that decrease in size

from the root to the extremity. The hair of the Tobacco-plant has a two-celled gland at the extremity, containing the narcotic secretion. The hair of the Lobelia is like a knotted club; others

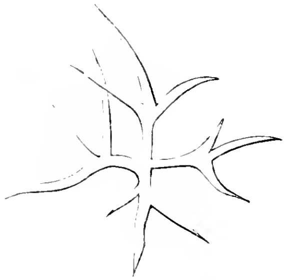


Fig. 100. Hair of Lavender.

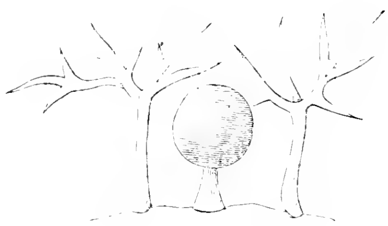


Fig. 101. Hairs of Lavender.

Fig. 102. Hair of Bean.

Fig. 103. Hair of Hop.

Fig. 104. Hairs of Balm Geranium.

assume a star-like appearance, like those of the Hollyhock and the Ivy. In the Geum we have another example of a club-shaped two-celled hair; while that of the Bean has a crook-shaped appearance. The flower of the Dead Nettle bears two-celled hairs remarkable for the number of knobs scattered over the surface; a similar appearance is presented by the hairs of the Wallflower and Chrysanthemum.

Many connecting links present themselves between hairs and scales, such as the stellate hairs of the *Deutzia scabra*, which a good deal resemble those within the air-chambers of the yellow Water Lily. The cuticle of the Ice-plant is covered with hairs that have the appearance of frozen dewdrops, and consist of very large oval-shaped cells which lie detached from one another upon the surface of the cuticle.

Fig. 105. Hair of Wallflower.

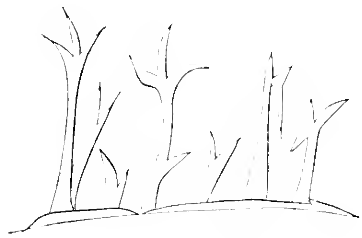


Fig. 106. Forked Hairs.

As we have probably said enough to draw the attention of young microscopists to this interesting branch of research, we need only add that vegetable hairs are easily preserved in weak spirit, while some retain their natural appearance very fairly in Canada Balsam. R. H. N. B.

[The figures illustrating this paper have been engraved facsimile from the writer's sketches. It was not until they were engraved that we discovered the majority of them to be indifferent copies, on an enlarged scale, from the Rev. J. G. Wood's "Common Objects for the Microscope." For this plagiarism, therefore, we trust that our readers will hold the author, and not the editor, responsible.—ED.]

REPTILES AND FISH REMAINS FROM THE COAL MEASURES.

WITHIN the last few months two excellent papers on the remains of fossil reptiles and fish found in the coal shale of Northumberland have been read before the members of the Tyneside Naturalists' Field Club in Newcastle-on-Tyne. The papers are the first of a series now in course of preparation, and are founded upon discoveries of fossil remains made by Mr. Thomas Atthey, of Gosforth, Northumberland, who for many years has devoted all his spare time to a most minute investigation into the fauna of the Northumberland coalfields.

Mr. Atthey's arduous and long-continued researches have been attended by most unexpected and unequalled success. He has now—I think it may be said without controversy—the best private collection of fossil carboniferous fauna in the world, and several of his specimens are absolutely unique, being new to science, and the only specimens of the kind in the possession of any geologist. Besides Mr. Atthey, there have been other labourers in the same department, but their discoveries are entirely eclipsed by those of their predecessor and co-labourer, whose object in collecting was not merely to extend knowledge by fragmentary descriptions, or surprise the scientific world by publishing at frequent intervals a succession of beautiful but unconnected discoveries, but to proceed with his investigations, and increase the stores in his museum until he could from them prepare a full and nearly exhaustive description of the carboniferous fossil fauna. Mr. Atthey has recently seen the importance of publishing as speedily as possible the results of his researches, as to a slight extent the ground he so fully occupied in private has been preoccupied by the publication of a paper on the teeth of fossil fish from the Northumberland coal measures, read by Professor Owen before the members of the Odontological Society.

Professor Owen's paper is based upon microscopical preparations of fossil teeth found by Mr. Craggs in the coal shale overlying the Low Main seam of coal at Cramlington colliery, Northumberland. The paper contains a description of twelve new genera, all of which, or nearly all of which, have been in the possession of Mr. Atthey for years, and the whole of which certainly do not form the one-hundredth part of his vast collection. The publication of the paper referred to has apparently roused Mr. Atthey to the importance of at once describing his numerous discoveries; and the two papers read before the members of the Tyneside Naturalists' Field Club—one of which was published in the *Annals of Natural History* for February, and the second will probably appear in the same magazine in April—gave but a faint idea of the numerous and remarkable discoveries made by this indefatigable labourer in a comparatively neglected field of scientific investigation.

I am informed that the whole of Mr. Atthey's admirable papers descriptive of his collection will appear in the Transactions of the Tyneside Naturalists' Field Club, and that they will be fully illustrated by drawings that are now in the hands of the engraver. It is almost impossible to give a brief written description of the skulls, jaws, teeth, vertebræ, ribs, &c., of the fish and reptiles referred to that would be at all satisfactory to the general reader without the aid of illustrations; and so far as I know at present, illustrations will only appear in the Transactions of the Tyneside Field Club.

Mr. Atthey's first paper contains a description of seven species of fish of the genus Ctenodus, which was founded by Agassiz upon a very imperfect specimen. Until the publication of Mr. Atthey's paper, only one species of this genus was known, Ctenodus cristatus, to which Mr. Atthey has added six, founded upon an extensive collection of specimens, viz., Ctenodus tuberculatus, Ctenodus corrugatus, Ctenodus obliquus, Ctenodus elegans, Ctenodus imbricatus, Ctenodus ellipticus, nearly all of which have been found in the shale overlying the coal in Newsham Colliery, Northumberland.

The second paper contains an exhaustive description of two new genera of reptiles, one having two species, and the other one. Of one of these species, Mr. Atthey has the skull, jaws, ribs, vertebræ, and other bones; and the length of the creature must have been considerable—probably from ten to fifteen feet. It may with propriety be termed the crocodile of the carboniferous period. It is the intention of Mr. Atthey to proceed with the description of his entire collection as rapidly as possible, and we may trust that before another year has passed away a dozen papers at least will be in the hands of the printer. All who are interested in palæontology are recommended to peruse Mr. Atthey's valuable papers, which will from time to time appear in the pages of *Annals of Natural History*. Mr. Sim, a working collier at West Cramlington colliery, has also discovered and prepared for the microscope several interesting remains of the fauna of the coal measures.

T. P. Barkas.

SPIDERS' WEBS.

If we take an open forceps, and wince off on it the central nets of half a dozen newly spun spiders' webs, and then, bringing the points together, pass the finger and thumb over them, we obtain a little dark-coloured bead of viscid gum, like bird-lime, in which the lines of the web form so small a part, that they can be found only by stretching the gum bead. It will thus appear that the web is mainly a delicate structure of gum suspended on the radial lines. The elastic cross-bars are in fact gum-drops drawn out, and are formed, there can be little doubt, by means of the large open tubes on the spinnerets; the fine tubes, common to all net-weaving spiders, are not so well suited to the deposition of gum-drops as to the spinning of threads. The figure of a spinneret, given in next page, was drawn under the microscope with the aid of the camera lucida, from a specimen taken from a very large garden spider, and mounted in fluid. It is much flattened and distorted by the pressure of the covering glass, which, however, happily displays the two kinds of tubes to better advantage.

In their normal position the tubes are crowded together into a close and even cushion.

Four at least of the six spinnerets of the garden spider are furnished with large tubes: they occupy nearly the whole of the small central spinnerets. The house-spider, which spins non-viscid webs, has none. This bead of dark viscid gum will retain its adhesive properties for months, being mixed in large proportion with the viscid and saline fluid which, in the form of minute globules, studs the elastic bars of the web. (For further particulars of which, a paper towards the close of the first volume of SCIENCE GOSSIP, p. 65, may be referred to.) What can be the source of this copious supply of fluid poured out so freely upon every new web is a very interesting inquiry.

Fig. 107. Spinneret of Garden Spider × 50.
a, Gum-tube; *b*, Spinning-tube; *c*, *c*, Hairs.

There are certain secreting organs in the abdomen of the common spider which have been a subject of controversy among comparative anatomists. Some have supposed them to be analogous to the biliary organs in other insects; but in this case they pour their secretion into the rectum, just above the vent, and so near to the lower termination of the intestine that they seem to furnish nothing to the internal functions of the insect. Others, again, have called them renal vessels, from their resemblance in position to the urinary organs of the higher animals. (See Jones's "General Structure of the Animal Kingdom," sec. 960, ed. 1864, and the figures there given.)

The discoveries since made as to the constituents of the web open a new and more probable conjecture. Here are secreting organs which anatomists have been unable satisfactorily to assign a use for, but which, or some such, are requisite for the completion of the web. The vent is, then, very probably the main source of the viscid fluid, and from this it is poured upon the elastic cross-bars as they are drawn out under the abdomen of the insect; the vent being close to and immediately behind the spinning apparatus.

It remains to be proved that these secreting organs are peculiar to the species forming viscid webs. My own attempt, with this view, on the dissection of the house spider has failed for want of skill: it must be the work of a more practised hand. This point proved, in accordance with my supposition, the problem of the spider's web, so long a difficulty to naturalists, would be in good measure solved. S. S.

ANIMALS THAT NEVER DIE.

UNDER the above title, I made some observations, in the January number of SCIENCE-GOSSIP, on the process of self-division in certain worms belonging to the genera *Nais* and *Syllis*, in regard to which your correspondent "B. C." accuses me of "inaccuracy in my description," and of "stultifying my results" by the use of the word "if." I have no wish to occupy valuable space in so personal a matter as this; nevertheless, I hope I may be allowed to place my words in juxtaposition with those of "B. C.," that others may see that, if the charge be true, it is a case in which the Horatian maxim is peculiarly applicable,

Mutato nomine, de te
Fabula narratur.

What I stated was this, that "at certain periods in the life of these animals, the posterior portion of the body begins to alter its shape. . . . At last, just at the point where it joins the first half of the body, a true head is formed . . . . and forthwith the whole drops off—a complete animal capable of maintaining a separate existence."

Now what says "B. C."? After describing a generative process, which (except on the most superficial view) has nothing to do with the subject before us, he writes—(I omit a few sentences which are not descriptive),—"I have frequently watched the process (viz., of self-division) in *Nais proboscidea* and *Nais serpentina*, but *could never satisfy myself that the new-formed segments differed in any respect from the anterior moiety*. . . . It seemed to me that in neither the old or new parts of individuals undergoing fission were ova or spermatazoa present. . . . The species is *capable of indefinite extension* by a sexual fission or budding. . . . The section generally akes place near the centre of the body, the head portion forming a new tail, and the tail portion a new head. . . . In a few days, it is impossible to say which individual was derived from the head, which from the tail." Wherein, let me ask, does "B. C.'s" description differ from mine?

Every one has a right to draw his own conclusions from what Nature places before his eyes. I believed it fair to infer (and I cannot see that I have violated the laws of logic in so doing) that if this process goes on for ever (that is, if the posterior

portion of the body is, to use "B. C.'s" own words, capable of indefinite extension), that then the extreme portion of the tail is practically never-dying." Of course the fact could only be proved *mathematically* by observations carried on through countless generations.

"B. C." holds a different opinion, and he is perfectly welcome to it; but I cannot help once more asking, wherein lies the difference between my statement, "If so and so happens," &c., or his "*Very likely* we shall find both of them undergoing new segmentation, *or quite as likely* both may have perished?" Surely these latter words imply as much doubt, and are as well fitted to "stultify" any prior reasoning as my poor little "if"!

I must own to two verbal errors in my account, due to hurried writing. The first is an Hibernicism, as I speak of "exceptions to a *universal* law." The other is mentioning *Nais* as if it was an exclusively "marine" genus.

The objections made to my somewhat sensational title by Mr. Stewart in the February number of SCIENCE-GOSSIP, are founded on the supposed fact that artificial slips and cuttings invariably die out altogether within a limited, though unknown, period; ergo, the divisions of *Nais* must do the same. For my own part, I must confess myself to be of the number of those who do not believe in the wearing out of varieties propagated by cuttings. At any rate, I am confident that the subject needs closer and more accurate observation than has yet been accorded to it, before it can be used as evidence in respect to what takes place in the domains of Nature.

Clifton. W. W. SPICER.

THE HOLLY TREE.

A FEW words in defence of this beautiful old English tree, for such it may, I think, without much error be termed, since, if not actually indigenous, it has been naturalized from days unrecorded, and is now considered by most writers to be a native of Great Britain.

I observe that one of the contributors to SCIENCE-GOSSIP says the poisonous properties of the berries are not so widely noticed as they should be in different works, but I cannot at this moment call to mind any botanical book of my acquaintance which does not mention them as possessing powerfully emetic and other dangerous qualities. We all know that strong emetics taken unadvisedly are often fatal; still, like most poisonous plants, it has its virtues, and in skilful hands can be made of great use.

There is a bitter substance in the leaves of the Holly, known to medical men as *Ilicine*, which possesses a most valuable febrifuge action. It is as efficacious as quinine, and far less expensive; indeed many persons consider, as it is slightly sedative, that it is a safer remedy in some cases than cinchona, for it mitigates the sensibility of various organs, where quinine would be likely to increase it. To Dr. Roussea belongs the merit of discovering this medical principle in the Holly *leaves*, but Ray, Gerard, and other older writers, allude to the remedial virtues of the berries, and prescribe ten or twelve of them as being "good against the colic." If Holly berries are hurtful to children, they decidedly are not so to monkeys: my little pet delights in them. I took him out on the lawn yesterday, and he sprang up into the branches of a splendid Holly tree, and eat considerably over the prescribed dozen before I could entice him down again.

Holly wood is used by turners in the making of "Tonbridge ware." It is a very hard, fine wood, and polishes beautifully. A gentleman, a friend of mine, rather devoted to his lathe, made some very charming ornaments of it, and afterwards stained them black: they looked exactly like ebony.

Birdlime too is made from the Holly bark. What boy does not know this fact?—that is, unless boys are altered in their habits since I was a little girl; I, in those days, often assisted in making it.

I never see a Holly tree in full winter array without thinking of old Evelyn's description of the hedge he planted by Peter the Great's advice at Say's Court: "Glittering with armed and varnished leaves, blushing with natural coral." By the way, writing of "armed" leaves reminds one of Southey's lines to the Holly,—

> Below a circling fence its leaves are seen
> Wrinkled and keen.
> No grazing cattle through their prickly round
> Can reach to wound;
> But as they grow where nothing is to fear,
> Smooth and unarmed the pointless leaves appear.

The idea is very poetic, but plain matter of fact tells a different tale. The young leaves of the Holly are unspined, because the spine comes with the age of the leaf; hence as the topmost leaves are the most juvenile, they are unarmed, while the lower ones are armed. Poets often run off with a popular fallacy, and clothe it in exquisite language. I was amused last week by some lines in which our yellow garden crocus is, because of its "golden hue," gifted by the author with the saffron-producing qualities of the *Crocus sativus*.

It would be well if others would follow Mr. Newlyn's example in drawing attention to different poisonous plants. The deadly Aconite, for instance, how general it is in cottage gardens, and almost every cottager I have ever spoken to on the subject has been ignorant of its dangerous properties. Then there is the Thorn-apple. I actually found some leaves of this most virulent plant amongst a basket of spinach which my gardener had picked, and my cook was going to dress for dinner one day.

HELEN E. WATNEY.

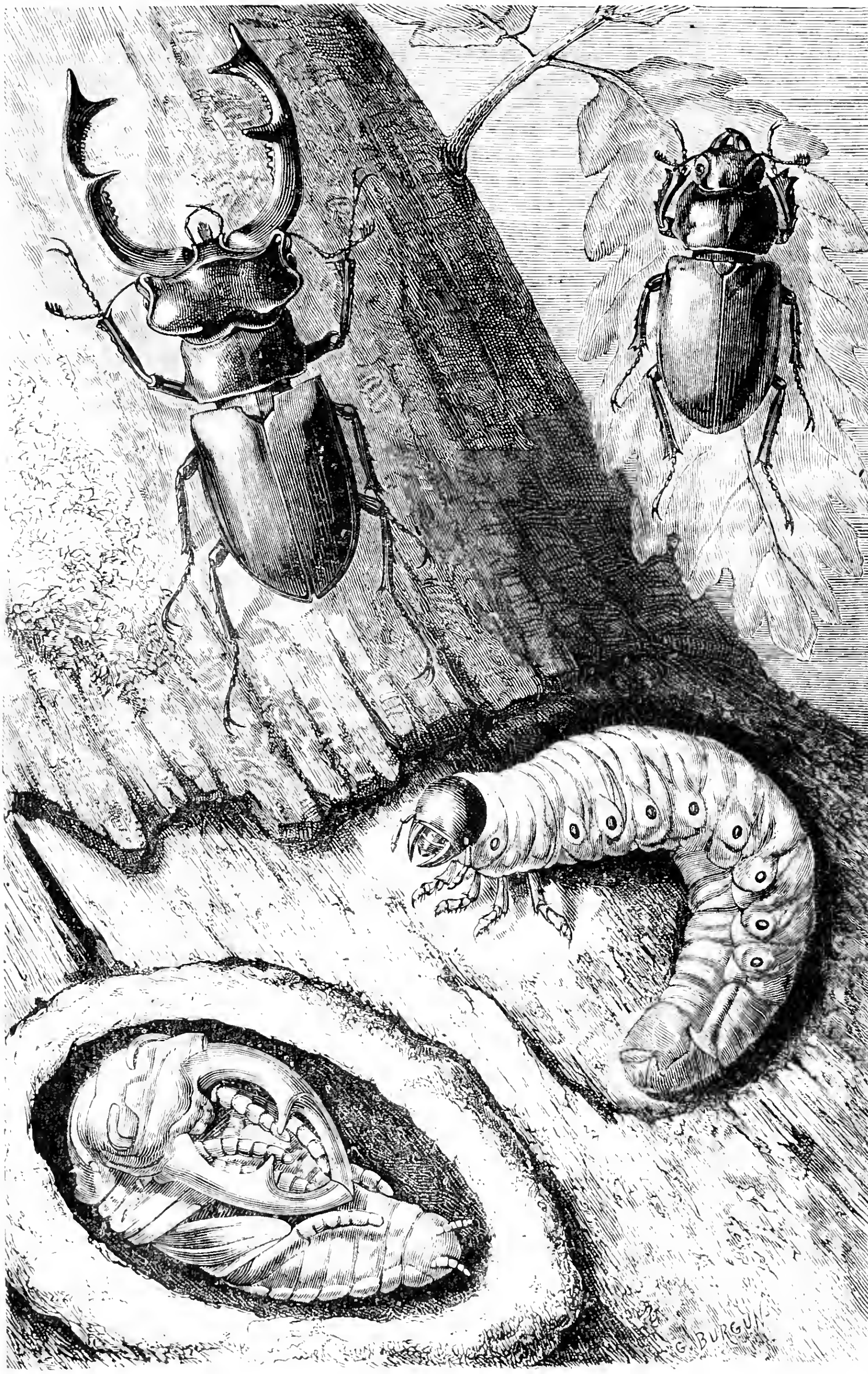


Fig. 108. Stag Beetle (*Lucanus cervus*).

THE STAG BEETLE.

(*Lucanus cervus.*)

OUR illustration of the metamorphoses of the Stag Beetle is from Professor Blanchard's recent work on the "Metamorphoses of Insects," already noticed in this journal. This large and formidable-looking beetle is well known to residents in the southern counties. Mr. E. C. Rye writes of it: "This species is not peculiar to the oak, but is found sometimes on willow—the specimens reared from the latter tree being smaller than the oak-fed examples. It is, however, a well-known fact that great differences in size are always found in species of which the larvæ feed on wood; owing to the many variations to which they are subject, from the good or bad quality, or too great or too little moisture, of their food, and the long period during which they remain in the larval state. Mr. G. R. Waterhouse has recorded the fact of his having kept a stag beetle alive for some time, which became comparatively tame, and nipped raspberries, &c., with its mandibles, sucking the juice afterwards with its tongue. In Germany there is (or used to be) a superstition that this beetle carries hot coals in its jaws from place to place. The larva of the stag beetle takes about four years before it assumes the pupa state. It is very large and fleshy, of a semi-transparent yellowish-white colour, with a large reddish head. It is peculiar on account of the anterior part of its body exhibiting certain slight transverse folds—a character at variance with its allies. When mature, it forms a cocoon of chips, in which it undergoes its final metamorphosis. The larva feeds in the solid wood, usually near the bark, and reduces it to a sort of tan. It has been considered to be the 'Cossus' of the Romans."

For further information on this and other of our British Coleoptera, we confidently recommend our readers to consult Mr. E. C. Rye's book on "British Beetles, an Introduction to the Study of our Indigenous Coleoptera," published by Reeve & Co., the cover of which glitters with the golden image of the "stag beetle."

Quekett Microscopical Club. — The first soirée of this club suffered considerably from the inclemency of the evening; but the second, which was held at University College on March 13th, amply compensated for the misfortunes of the first. This was emphatically a "bumper," and although our space forbids us entering upon the details of what was exhibited, this receives compensation in the second number of the *Quekett Miscroscopical Journal*, which contains the official report. But one opinion and one feeling prevailed throughout the evening, which may be represented by the one word "success."

THE HAWFINCH.

(*Coccothraustes vulgaris.*)

THE genus *Coccothraustes* is essentially Palæarctic, and is justly considered by Dr. Sclater as a typical genus of that region. It is represented by only one known species, the Hawfinch of the British Islands, which is extended over the whole of Europe and Siberia,* and is recognizable by its strongly-developed beak and the rhomboidal form of the secundaries. I shall first proceed to consider its habits, and then its geographical distribution.

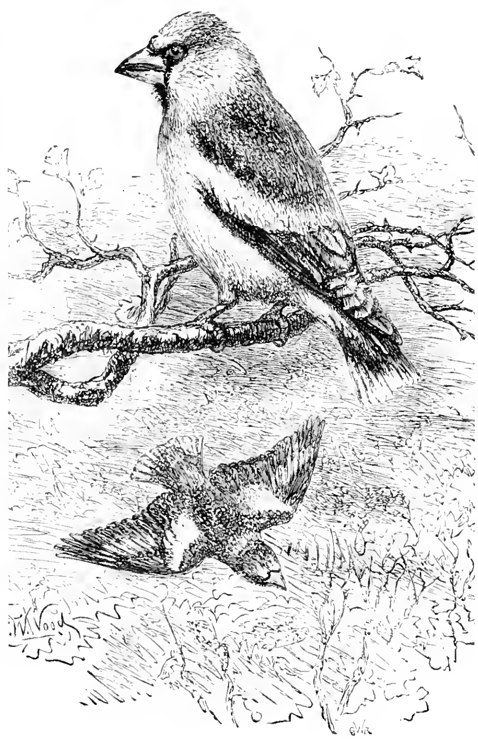


Fig. 109. The Hawfinch.

Formerly the Hawfinch was looked upon as quite an uncommon bird in this country, but of late years has been met with more frequently, and, according to Mr. A. G. More,† is "reported as now breeding regularly in Wilts, Kent, Surrey, Essex, Middlesex, and Bucks. The nest has also been found in Dorset, Hants, Sussex, Herts, Berks, Oxford, Suffolk, Norfolk, Warwick, Rutland, Derby, and at Cusworth, near Doncaster." I must except from Mr. More's list the county of Berks from among the latter list of names, and place it among

* I do not think the Hawfinch of Japan, by some considered to be a good species, can be separated from *C. vulgaris.*

† *Ibis*, 1865, p. 128.

those in which the Hawfinch breeds regularly. My ornithological observations, taken near Cookham, Berks, have proved that the Hawfinch is a regular breeder in the Duchess of Sutherland's woods at Cliefden, and I have little doubt that it will be found to build in most of the large woods in the south-eastern counties of England; but owing to the extremely wary nature of the bird, it has doubtless been overlooked.

In Epping Forest the Hawfinch used to breed plentifully, and Mr. Henry Doubleday has written a very interesting account of its habits and nidification. Unfortunately, space will not allow me to quote all his observations entire, but I have ventured to extract the pith, and for the entire essay must refer my readers either to his original article,* or to Mr. Gould's magnificent work on the "Birds of Great Britain," where an excellent figure of the old and young birds is given. Mr. Doubleday says, "Their principal food here seems to be the seed of the hornbeam (*Carpinus betulus*), which is the prevailing species of tree in Epping Forest; they also feed on the kernels of the haws, plum-stones, laurel-berries, &c., and in summer make great havoc amongst green peas in gardens in the vicinity of the forest. About the middle of April they pair, and in a week or two commence nidification. The situation of the nest is various, but it is most commonly placed in an old scrubby white-thorn bush, often in a very exposed situation; they also frequently build on the horizontal arms of old oaks, the heads of pollard hornbeams, in hollies, and occasionally in fir-trees in plantations; the elevation at which the nest is placed varying from five to twenty-five or thirty feet. The most correct description of the nest I have seen is in Latham's "Synopsis." It is there said to be composed of the dead twigs of oak, honeysuckle, &c., intermixed with pieces of grey lichen. The quantity of this last material varies much in different nests, but it is never absent; in some it is only very sparingly placed among the twigs, in others the greater part of the nest is composed of it; the lining consists of fine roots and a little hair. The whole fabric is very loosely put together, and it requires considerable care to remove it from its situation uninjured. The young are hatched about the third week in May, and as soon as they are able to provide for themselves, they unite with the old birds in flocks, varying in numbers from fifteen or twenty to one hundred or even to two hundred individuals. In this manner they remain through the winter, feeding on the hornbeam seeds which have fallen to the ground, the newly-cracked shells of which are to be seen in abundance at their haunts; the birds only separate at the approach of the breeding season. I believe the male has no song worth notice. In warm days in March I have heard them, when a number have been sitting together on a tree, uttering a few notes in a soft tone, bearing some resemblance to those of the Bullfinch."

I am able to confirm Mr. Doubleday's observations as regards the Hawfinch's partiality for green peas. Mr. Briggs, the head-gardener at Formosa, near Cookham, has shown me Hawfinches which he has shot in the act of pilfering the peas, and which have had their crops distended with them. These are always young birds, as the old ones are far too wary to approach the neighbourhood of habitations in the daytime. Their hour of depredation is in the early morning, when they descend with vigour upon the plum and other fruit trees; and when the gardener rises and comes for his fruit, he finds the ripest gone, and nothing left but the "flesh" of the plums, and the chips of stones, lying strewn under the tree in all directions, while all that can be seen of the marauder is a small bird, conspicuous from the white on the tail, shoulders, and wings, scudding away, like lightning, to the nearest thicket, into which it plunges, and is seen no more. Mr. Briggs has often watched the Hawfinches at work, and he tells me the dexterity with which they strip off the fruit to get at the kernels is marvellous. One turn of the head in either direction and the stone is laid bare; then comes a sharp "crack," and the chips fall to the ground, while the bird immediately proceeds to another plum. For procuring this kind of food its hard strong beak is admirably adapted. It may be said that by thus exposing his depredations I am stirring up the enmity of the gardeners against the Hawfinch, but of this I have not much fear. He is able to take care of himself, and where he is not yet known he is likely to remain long so, for of all our English birds there is not one shyer, or more difficult to see.

But the Hawfinch, wary as he may be, has a far more subtle and dangerous foe in the bird-catcher. Last year several bred near Hampstead, where the bird has been common for the last few years. In this neighbourhood dozens of Hawfinches are captured annually, while I know one bird-fancier alone who had eighteen eggs of this species brought to him one morning last summer.

There are many more interesting details connected with the Hawfinch, if space would allow me to consider them. I must, however, say one word in conclusion with regard to its geographical distribution. It is found all over the continent of Europe, and Mr. Gould has specimens from Asia Minor. Mr. Salvin met with it in the Eastern Atlas, and it is a winter visitant to Algeria, according to Loche, who says that it occasionally breeds in this latter country. It was observed by the Rev. H. B. Tristram once near Gilead, in Palestine; and, according to Lord Lilford, is common in Epirus

* *Magazine of Zoology and Botany*, vol. i.

in winter. We learn from Demidoff that "it is spread over all the gardens in South Russia, generally disappearing in the middle of winter for a few months. Its favourite food is the nut of *Eleagnus angustifolia*. In autumn it sometimes makes its appearance along with *Bombycilla garrula*."

The Hawfinch was met with by Radde and Middendorf in Siberia, and by Schrenk in Amoorland; and in Japan is represented by the *Coccothraustes vulgaris japonicus* of Temminck and Schlegel, which at the best can only be considered a race of the common bird. Mr. Gould says that Chinese specimens in his collection are precisely similar to European birds. It is not found in India.

R. B. Sharpe.

ULOTHRIX.

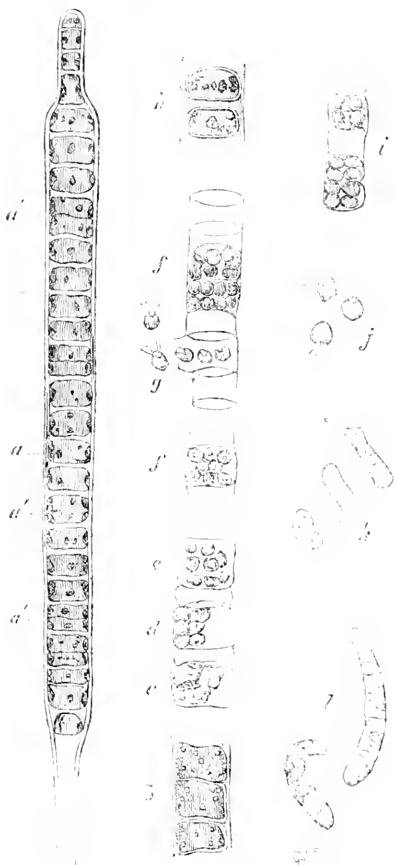


Fig. 110. Ulothrix.

THIS is a genus of confervoid algæ of somewhat common occurrence in clear ponds and running water, in which they appear like long streaming green threads attached to stones, &c.

The filaments consist apparently of one long enveloping cell, containing shorter cells filled with pale-coloured chlorophyll, in which there occur grains of a denser colour. The green contents seem at first to adhere to the outer cell-wall; but in the growth of the plant they become detached, and each obtains its own cell-wall (fig. *h*). Fig. *a* shows a young filament in which the cells are clearly seen to increase by cell division (*á*). In mature plants the chlorophyll granules appear to increase in numbers (*b*), and the contents of the cell fall to one side, and divide at first into four (*c*), then into eight portions (*d*, *e*), which are at length converted into ciliated zoospores (*g*), and escape from the cell by the rupture of its wall.

In another species (*i*) the contents are converted only into four zoospores. These, after moving rapidly about in the water for a time, become slightly elongated sideways, having two nuclei (*j*). They then attach themselves to some other body, lose their cilia, and begin to grow. The stages of one day's growth are shown at (*k*), and of two days' growth at (*l*).

J. S. Tute.

COLLECTING BOTTLES.

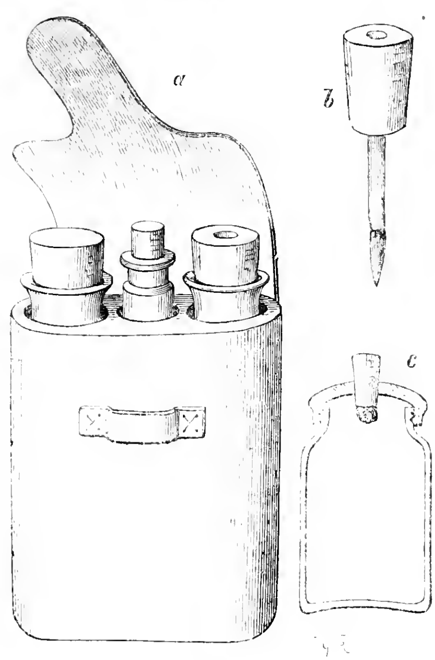


Fig. 111.

IN bygone days the insect-hunter was recommended to carry with him a bottle (small, of course) of whisky or other strong spirit in which to stupify and drown his coleoptera, whilst his lepidoptera were to be tortured to death with the fumes of burning brimstone. These rough methods of treatment, so unpleasant to the true naturalist,

are entirely superseded by the use of chloroform, which may be economically applied by means of the following contrivance:—

Fig. 111, *a*, represents the case complete, containing two ordinary test-tubes about half an inch in diameter and three or four inches long, and a small bottle of chloroform. These are fitted loosely into the end of a stout piece of deal wood by boring with a joiner's auger; the wood is then reduced to the smallest dimensions consistent with strength, and covered with leather according to fancy. Fig. 111, *b*, represents one of the corks from the tubes fitted with a small camel-hair pencil, the test-tubes being of the same diameter. The corks can be changed, and one pencil is sufficient for the two. Having made a capture, the pencil is dipped into the chloroform, and quickly applied to the tube containing the insect. Small specimens are instantly stupified; so a number of them may be placed in one tube without danger of mutilation. If the tube be kept corked tight as much as possible, one dip of the pencil will serve for a number of small insects. For larger specimens, the screw-top bottles answer well, with a cork fitted through the wood top, and a piece of sponge fixed, as shown at *c*.

The small brush is also useful for sweeping small specimens into the tubes. In this way (the brush moist with chloroform) I have captured at various times upwards of one hundred Podura (springtails).

P.

ON THE TABLE.

THE three books "on the table" which call for special notice this month belong respectively to Zoology, Botany, and Astronomy, and are devoted to the popular phases of each. Here is a Local History of Birds, a Gardening Book, and Half-hours with the Telescope. The first of these is entitled "The Birds of Berkshire and Buckinghamshire, a contribution to the Natural History of the two counties, by Alexander W. M. Clark Kennedy. Fcap. 8vo., pp. 232. Eton: Ingalton & Drake. London: Simpkin, Marshall, & Co." The author professes to follow in the footsteps of the able authors of "Ornithological Rambles in Sussex," the "Birds of Middlesex," and the "Birds of Norfolk," and all that the printer's art could perform for him has been achieved. If the work is not equal to that of some of his exemplars, the author has, at least, in this, his "first literary essay," succeeded in producing a useful and pretty contribution to our ornithological literature, which is highly creditable to an "author of sixteen." We will not look with too critical an eye at the coloured photographs, but wish the volume all the success which its youthful author can desire, and close it with the following anecdote of the "Hooded Crow":—

"A friend was driving home one evening, when he observed one of these crows feeding on a dead sheep by the roadside: he shot it, picked it up, and placed it carefully in the bottom of the carriage—apparently quite dead. He had not proceeded far when, on hearing a noise behind him, he looked round, and was surprised to see the bird sitting on the back rail of the vehicle; on stretching out his hand to recapture it, to his amazement, the crow flew away. He watched it for some distance, and, as it flew strongly and well, it appeared evident that the bird had been only shamming."

The next volume is a "Handy Book of the Flower Garden, being practical directions for the propagation, culture, and arrangement of plants in flower-gardens all the year round, by David Thomson, gardener to Lady Mary Claude Nisbet Hamilton. Small 8vo., pp. 364. London and Edinburgh: William Blackwood & Sons." This is just the practical book which the amateur, with a garden under his own hands, will be glad to see. It is written by one who is evidently thoroughly up in the subject, and, what is more rare in a gardener, possesses the power of communicating in a book his knowledge to others. The volume is neatly got up, well arranged, clearly written, and contains good lists of plants for all seasons and conditions, and, altogether, receives our hearty commendation.

Finally, we have "Half-hours with the Telescope, being a popular guide to the use of the Telescope as a means of Amusement and Instruction, by Richard A. Proctor, B.A., F.R.A.S., with illustrations on stone and wood. 12mo., pp. 109. London: Robert Hardwicke." This is a companion volume to Dr. Lankester's "Half-hours with the Microscope," and gives in seven chapters much practical information on the structure and use of the telescope. It is just the popular book on the subject that was wanted, and contains within a small compass, in plain language, what *many* wish to know, and *none* should be ignorant of who aspire to be "lovers of nature."

MISTLETOE ON AZALEA.—We believe that the presence of Mistletoe on an Azalea is a fact heretofore without parallel; nevertheless, the following note from Mr. Rust, the gardener at Eridge Castle, Tunbridge Wells, shows that it is really a *fait accompli*:—"In this neighbourhood Mistletoe is very abundant; it grows on the Thorn, Crab, Apple, and on the Poplar in great quantities; but I certainly was surprised to find it one day last week growing on one of our common hardy Azaleas in the shrubbery here. The parasite in question is in a prosperous condition, and appears as if it would make a good growth this year."—*Gardener's Chronicle, April 4, 1868.*

ZOOLOGY.

Singular Battle.—On Monday evening two ducks, in a field near Thomas Town, Merthyr, deposited two eggs on the grass, and were waggling off with the customary shake of the tail which closes such proceedings, when a rook flew down and began to inspect the deposit. This the ducks objected to, and one more pugnacious than the other, ran at the black gentleman and tried viciously to pinch him. The rook hopped off, but took good care not to leave the neighbourhood of the eggs, which a peck of his bill had assured him were very savoury. So every now and then there was a rush of the duck, a hop of the rook, then a peck of the rook at the forbidden luxury, another rush, and so on, duck occasionally coming in for a peck herself, until both eggs were demolished.—*Standard, April 8th.*

The Death-Watch.—I have been much interested with Mr. Prince's very circumstantial account of the habits of the minute species of the family *Procidæ* figured by him in the last number, and which is one of those to which the "Death-Watch" is commonly attributed. He appears to me to have brought the ticking noise nearer home to the creature than has hitherto been done; and this in the face of my positively expressed opinion (*vide* Science-Gossip, 1867, p. 51) that this family of insects is incapable of producing the sound, makes me the more anxious that he should follow up his observations and find out the *modus operandi;* and I shall be greatly obliged if he will forward to me, alive, an example taken in the act of ticking. I may be permitted to observe that the creature figured is not the generally so-called *Atropos pulsatoria*, which is smaller, darker, and without any rudiments of wing-scales, the one, in fact, which causes such ravages in neglected boxes of insects and plants. Mr. Prince's insect is, however, the true *Termes pulsatorium* of Linnæus; for which Westwood proposed the generic term *Clothilla*, with the specific name of *studiosa*, from its habits of frequenting books and papers, where *Atropos* is not so often seen.—*R. M'Lachlan, 20, Limes Grove North, Lewisham, S.E.*

Ferocity of a Sow.—The autumn before last, whilst taking shelter from a heavy storm of thunder and lightning in a cottager's house in Hertfordshire, I observed a fine full-grown cock (frightened by the noise of the thunder) fly into a pig-sty, this was on the instant followed by ferocious grunts and a death struggle, for on going over to the sty a few moments afterwards, I found that the sow had not only killed, but had actually devoured the cock (feathers and all), leaving only one foot and the beak end of the head as proofs of the sow's savage frame of mind.—*W. G. S.*

Cuckoo and Hedge Sparrow.—During the month of May, last year, a Hedge Sparrow built her nest in a gooseberry bush trained to wooden palings, and after three blue eggs had been laid, I was informed that another egg of a different colour was in the nest. Upon examination I found that it was a Cuckoo's egg. Two more blue eggs were laid after this, and the hen began to sit. In due course of time the three blue eggs were hatched, and soon afterwards the Cuckoo's egg. No sooner had this event occurred than the remaining *two eggs* and *one* of the young Hedge Sparrows were ejected from the nest. This I discovered upon visiting it in the forenoon of the day upon which the Cuckoo's egg was hatched. The little Hedge Sparrow was living, and I replaced it in the nest; the two eggs were lying broken upon the ground. When I visited it again about noon, I found two of the young birds ejected and dead, and before evening the other was thrown out. I took the young Cuckoo out and found that its legs were unable to sustain its weight, and in fact that it was powerless for either aggression or self-defence; indeed it appeared both in the nest and in my hand weaker than most birds are at the same age, and remained so for some days. My firm conviction is that *the mother disposed of her own offspring*, knowing (I suppose by intuition) that the young Cuckoo would task her feeding powers and nursing capabilities to the utmost, she was most attentive to her foster child until he was nearly full grown, feeding him every few minutes, until he flew away and we finally lost sight of him. My family and I watched the case with great interest, as it was the first time one capable of observation had presented itself to us, and as the season is now approaching when the Cuckoo will visit us

In April
Come he will.

I have sent you these facts hoping that they will induce other ornithologists to watch closely any case of this kind, and see whether the hen Hedge Sparrow ejects her own young (as I am satisfied that the one in question did, although no one saw her positively in the act, and also because the young Cuckoo was perfectly unable to do it), or whether as a rule the Cuckoo itself ejects the rightful brood from their mother's nest.—*J. P.*

Rare Crab.—While hunting in the rock-pools at high-water mark, in March last, I had the good fortune to capture a fine female specimen (carrying spawn) of Cranch's Spider Crab (*Anchœus Cranchii*, Leach). Bell says, "Of the occurrence of this species on our coasts, we have, I believe, only two recorded instances." It has the habit (differing from the other Spider Crabs which I have seen) of folding its legs close under the body, and feigning death on the slightest alarm.—*G. Sim, Aberdeen.*

Venom of Toads.—The Toad, formerly considered as a creature to be feared, does in reality possess a venom capable of killing certain animals and injuring man. This poison is not as is generally thought, secreted by the mouth: it is a sort of epidemic cutaneous secretion, which acts powerfully if the skin be abraded at the time of contact. Dogs which bite toads, soon give voice to howls of pain. On examination it is found that the palate and tongue are swollen, and a viscous mucus is exuded. Smaller animals coming under the influence of the venom undergo true narcotic poisoning, soon followed by convulsions and death. Experiments made by MM. Gratiolet, Cloez, and Vulpian, show that the matter exuding from the parotid region of the toad becomes poisonous when introduced into the tissues. A tortoise of the species *Testudo Mauritanica* lamed in the hind foot, was completely paralysed at the end of fifteen days; and the paralysis lasted during several months. Some savages in South America use the acid fluid of the cutaneous glands of the toad instead of the curara. The venom exists in somewhat large quantities on the toad's back. Heated with ether, it dissolves, leaving a residuum; the evaporated solution exhibits oleaginous granules. The residuum contains a toxic powder sufficiently strong, even after complete desiccation, to kill a small bird.—*British Medical Journal.*

Corn-crake.—Could you inform me if the Corn-crake (*Gallinula crex*) ever arrives here as early as the 4th of April? For I certainly heard one on that date in some fields totally devoid of trees or hedges; so that it is not possible for me to have confused it with either the missit, thrush, or jack-daw.—*Samuel Drewett, Luton, Beds.*

[The latter end of April is the usual period for the appearance of the Corn-crake.]

The Three Rooks.—In 1865 a rook's nest was built in a large elm-tree upon the school estate in this village, *three* rooks taking their share in the work, and two constantly occupying it when completed; the third being engaged in feeding the two sitting partners. They were unsuccessful with heir first batch of eggs, but late in the season tried again, and reared two or three young ones. In the autumn of the same year the rooks removed the material of the nest, and reconstructed it in the next tree; but in the spring of 1866 returned to the old place, using the old material so far as it would go; the partnership again consisting of *three* members, which were again successful in rearing their young. This year the nest is being repaired, and is only tenanted by two birds; but another is nearly completed in the same tree, and belongs to another company of *three*. Can any of the readers of Science-Gossip inform me if this kind of eccentricity is common among birds; or is this a solitary case of hereditary peculiarity?—*A. Linney.*

Furze Mites.—We have received from Mr. W. T. Loy, of Croydon, specimens of Furze Mites taken at Croydon in August, 1867, and therefore record the locality as an additional one to those previously named by the Rev. W. W. Spicer in this journal.

Church Service Stopped by Moths.—A remarkable plague of moths fell upon Sydney and St. Leonard's, Australia, last autumn. The Rev. W. B. Clark, writing from the latter place under date of October 10, says the moths first appeared in the church on the 14th of September, and for a month from that time had gone on increasing in numbers; and although several bushels had been destroyed, the army was undiminished. On Sunday 6th October, the state of the church was such, from the accumulated dust from the moths' wings, and the incessant swarms that were continually flying through the building, that divine service could not be held therein. On the 10th October, Mr. Clark counted 80,000 on the windows alone; and in the tower and below the floor he calculated there were many millions. From specimens forwarded to this country, the creature is ascertained to be the "Boogong" or "Gnarliong" moth (*Agrotis spini*). It is eaten by the aborigines, either baked in the ground, or pounded into a paste for cakes. (See also Science-Gossip, 1866, p. 45.)

Ancient Turtle.—The *Oxford Democrat* tells this story of an ancient turtle. Last fall, Melander Forbes, of East Buckfield, found in that vicinity a Mud Turtle, about ten inches in diameter, which was marked on the under shell, "J. P. 1826," being much worn, which were the initials of Capt. Joseph Parris, of Buckfield, deceased father of Hon. V. D. Parris. Besides a cross, it bore the initials "O. P." of Orren Philbrook, of Buckfield, deceased of later date. It was minus one half of one of its fore legs. After marking him again, he was permitted to run at large. Martin Drake, now of Buckfield, saw the Parris turtle, so called, in 1810, half a mile from the place where last seen, marked "J. P."

The Californian Quail.—This is not a British species, clearly, and can have only escaped from some aviary. As it freely breeds in captivity, it has become a common bird in Britain: it has no claim, however, to be considered even a rare visitor to this country.—*C. O. G. Napier.*

West London Field Club is the new title assumed by the Society of Amateur Botanists, in indication of its having ceased to confine its operations to botany, and that for the future its principal feature will be field-work. The executive solicit the co-operation of entomological amateurs, and all persons interested in natural history. A list of excursions for the summer is in preparation.

BOTANY.

VENATION OF THE UMBELLIFERÆ.—In the *Quarterly Journal of Microscopical Science* for January is a paper by Mr. T. Gorham on the above subject, in which, among other conclusions, the writer comes to the following,—"that a considerable number of the Umbelliferæ have a venation peculiar to themselves, and which does not find a place under any of the division, that have heretofore existed; that this peculiarity consists in the existence of a vein at the very edge of the leaf itself, and which, more or less, entirely fringes its whole margin; that this marginal vein is to be found certainly in one half, if not more of the species belonging to the Umbelliferæ; and hence that it may be said to constitute a form of venation peculiar to this order, and to give a character to it which does not belong to other orders of plants." Now I fear Mr. Gorham has either too hastily generalized or not sufficiently examined other plants, because the said venation is certainly *not* confined to the Umbelliferæ. The only plants I have at present been able to operate upon are some of the evergreens, several of which have this "peculiar venation." The first I tried was the Box, which gave a very beautiful marginal vein; the Ivy and Euonymus did not; but the Holly and Berberry did: the Myrtle not only gave the marginal vein, but to me a curious state of venation; for, treating it as I had the others, by boiling in *liquor potassæ*, I removed the cuticle, and found the veinage consisted of two laminæ, united at the margin, but easily separable. Now I would ask botanists whether they have observed a similar state of things with other leaves. I have a strong impression that the marginal vein will be found in many deciduous plants, and will therefore negative the idea that it is *peculiar* to the Umbelliferæ. Microscopists will obtain some very beautiful preparations of skeletons and cuticles by boiling leaves for a few minutes in *liquor potassæ*. Some, like the Box, with gentle pressure, either with the finger or camel-hair pencil, under warm water, may, after boiling, be so manipulated as to remove all but the cuticles and skeleton, which may then be mounted in glycerine jelly or balsam.—*T. W. W., Brighton.*

EARLY SPRING FLOWERS.—I expect you will be overwhelmed with communications on this subject; yet I enclose the dates of flowering of a few of our Wycombe wild flowers, which are this season much earlier than usual. Windflower (*Anemone nemorosa*), March 7; Goldilocks (*Ranunculus auricomus*), April 6; Meadow Crowfoot (*R. acris*), March 25; Great Stitchwort (*Stellaria holostea*), March 25; Wood Sorrel (*Oxalis acetosella*), March 15; Golden Saxifrage (*Chrysosplenium oppositifolium*), March 28; Moschatel (*Adoxa moschatellina*), March 25; Toothwort (*Lathræa squamaria*), April 7; Cowslip (*Primula veris*), March 7; Mezereon (*Daphne Mezereum*), March 7; Wood Spurge (*Euphorbia amygdaloïdes*), March 18; Daffodil (*Narcissus pseudo-Narcissus*), March 17. The Golden Saxifrage, Toothwort, and Mezereon had been out for at least a week when first observed: the last named, of course, blossoms much earlier in gardens; but, until this year, I have never seen it in flower in our woods earlier than March 28.—*B.*

CLAYTONIA PERFOLIATA.—Can you inform me when *Claytonia perfoliata* was first observed in this country? I came into possession a short time since of a collection of dried plants mostly collected in this neighbourhood, and among them I found a very good specimen of *C. perfoliata*, which had been raised from seed of a wild plant growing at Caistor, near Great Yarmouth, in 1836. About twelve years since I observed it growing in quite another habitat in the neighbourhood of Yarmouth, on a sandy bank by the roadside. Since then it has been spreading inland, and a few days since I found the banks of a lane near where I made my first discovery for more than half a mile covered with this singular plant. I find no mention of it in the Yarmouth catalogue of plants by Mr. James Paget Gale, 1834. There is a specimen named *C. alsinoides* in the herbarium of the late John Drew Salmon (now in the Norfolk and Norwich Museum), which resembles *perfoliata*, and was gathered in a wood at Edensor, about two miles from Chatsworth, in July, 1849. In a note in Mr. Salmon's "Hooker's British Flora" he says it was first observed there in 1837. If it is still to be found, I shall be glad of a specimen to compare with *C. perfoliata.*—*Hampden G. Glasspoole, Ormesby St. Michael.*

EDIBLE SPRING FUNGI.—I have observed a non-deliquescent, black-spored Agaric (*Agaricus phhlænarum*, Bull), which seems very nearly to coincide with Berkeley's description of *Panæolus separatus*, cropping up in immense quantities from a seakale bed in this neighbourhood. The bed is made with sawdust used for littering a stable, and the portions bearing the fungi are exposed to the air, with little or no internal heat. The soft delicate biscuit-brown colour, and the abundance and not unwholesome smell of the specimens, inclined me to experiment upon their edible qualities—cautiously enough at first—for I hold the maxim, "consider every one a rogue until he proves himself a true man," applicable to the *Toadstool* family. Having, however, at last consumed some considerable quantities—say a dozen or so at a time—without the slightest inconvenience, I venture to recommend the variety to your readers, not by any means as equal to the autumn kinds, but as a wholesome and delicately-flavoured substitute

during the interregnum of the tribe. Freshly-gathered and undecayed specimens should be selected for the frying-pan, sliced with the usual accompaniments, and removed the instant they become soft and dark coloured. Whilst on the subject of *Fungi*, I may as well add that I have found the following an easy and useful way of preserving the spores, and autographing to a certain extent the shape and justaposition of the gills. I place a piece of gummed paper (white, drab, or black, in reverse of the expected colour of the deposit) in a damp place (a box with a wet sponge in it will do in summer), until it has become sticky and relaxed in texture. I then lay the cap, gills downward, upon it, as usually directed, not allowing it to remain too long, and when the specimens are removed, and the paper dried, I have a fixed and indelible impression for future reference. When required for microscopic investigation by transmitted light, the gum (which should be the best white, sold in powder) should be spread on *collodionized glass*, instead of paper, and a *second* coating of collodion poured upon the dry impression. The double film with the intervening spores may then be separated from the glass when dry, and packed in a very small space. I do not know if collodion has been used in this way before, but I can strongly recommend it for extempore preservation of small dry objects for the microscope as an economy of time and space.—*J. Aubrey Clark, Street, Somerset.*

MICROSCOPY.

OBJECTS.—I am acquainted with several microcopic objects, of which I have never seen any notice, which only require mention to become general favourites. One of these is the transverse section of Laburnum wood. This is the most beautiful wood section I have ever seen, and one of the most beautiful objects. I regret my inability to make a satisfactory sketch, although, as the prettiness depends as much on colour as anything else, this is of less moment. When mounted in balsam, *without previous soaking in turpentine*, the different shades of colour, from red and yellow to palest amber, intermixed with browns, is very pleasing. Peculiar eye-like spots of resin are mottled all over it, giving it a character of its own. The cells also show great variety, both of shape and size. I am persuaded that this object would be considered a gem in almost any collection of objects. Another object is the hair from a species of caterpillar, which three summers ago was very plentiful in Brompton Cemetery, and on the trees surrounding Christ Church, Chelsea. Its name I do not know; but on its back there were four tussocks of hair, much resembling that of the humble bee, and its tail consisted of a much larger tussock of entirely different hair. This tail hair is the object I would draw attention to. It is branched from the roots, but at the end the stem thickens, and the branches become longer, giving it a shape generally resembling a mace. It is of a light-brown colour, and is much handsomer than many hairs that are highly prized. The antennæ of the moth into which the caterpillar changes are also worthy of observation, being beautifully branched, and the branches having hairs upon them. I should be glad if some person would inform me what is the name of the moth. The caterpillar feeds upon the lime-tree. I have found that the net-like markings on deer hair show much better on a green background, as does also the hair of the above-mentioned caterpillar—Silver Fox hair, Mole hair, and Mouse hair; while Yellow Cat hair, Hare hair, Canterbury bell seed, Goldfinch feather, Lark's feather, Cork, Elder pith, Herring gills, Virginian stock pollen, Strawberry pollen, Deal section, Rhubarb section, and Sulphur and Cabbage Butterfly scales show well on a red background. Dandelion pollen is seen to advantage on blue. I have just had a proof of the ability of at least one spider to rise in the air. Feeling something crawling on my hand, I shook it, and a small black spider fell by his thread about fourteen inches below it. I snapped the thread with the other hand, and held him up to a level with my face, when he at once began to rise in a curved line, scarcely seeming to lengthen his thread until on a level with my hand. I then called a friend's attention to him, when we both saw him rise steadily twelve or fourteen feet in a nearly vertical direction. The sun was shining brightly, and we could distinctly see his thread from my hand up to him, and also that his thread went no higher than himself, and that, consequently, he was not running up it. At the height mentioned he was arrived within the shadow of a roof, and we lost sight of him. I may add there was no air stirring worth mention.—*Edwin Holmes.*

BERLIN BLACK.—At the March meeting of the Quekett Microscopical Club, Mr. R. T. Lewis read a short paper in which he strongly recommended Berlin black as being a great improvement upon the ordinary Brunswick black commonly used in object mounting. Its advantages were that it dried perfectly in the course of a few minutes, with a smooth dull surface, upon which thin gum would spread as easily as upon paper, and a single coating of it upon glass was for all practical purposes opaque. These properties render it especially useful in spotting the interior of cells in which objects are to be mounted for lieberkuhn illumination. When used for finishing off slides, its dry surface may be highly polished by rubbing it with a piece of soft cloth or silk.

NOTES AND QUERIES.

Ants.—Have they reasoning powers? Mr. B. Taylor in your last number revives this old question. Of course if the question be answered in the affirmative, we cannot deny these powers to other animals as well, and I cannot see how any naturalist in the present day can so deny them; in fact, I think few of our leading men do. The subject involves far too many considerations to be entered upon here; but we have only to watch these said ants in their labours, the bee in its hive, the dog with his master, to become convinced that the old idea of blind, unreasoning instinct was a false one, and that whatever instincts they may possess, they certainly have also "perception, reflection, and judgment." None of us know why they should not; we have, perhaps, imbibed the idea with our growth, but we cannot tell where from. We should all probably acknowledge, as in the instance brought before us, that they can communicate with each other, and if so, they must have some ideas to communicate. Can they have any ideas without thought? Can thought exist without reasoning faculties? There were one or two interesting articles on the subject in the *Intellectual Observer* some few years back, and I, for one, unhesitatingly subscribe to the opinion there expressed, that all animals possess reasoning powers, differing from our own, not all in kind, but only in degree.—*Henry Ullyett.*

House-flies.—These insects are ovaviparous, and therefore deposit no eggs. I have frequently examined them, and seen the living larvæ in situ in the abdomen of the parent.—*T. G. P.*

House-flies.—If "C. H. B." will refer to Science-Gossip, vol. i., p. 81, perhaps he may recognize his larvæ. If they were those of the "viviparous housefly," probably the eggs were laid in the jar, but if not, I should imagine them to be of an oviviparous outdoor species, the eggs of which were in the Conium when gathered. If the Ext. Conii was prepared by the process of the British Pharmacopœia, the heat employed (140° F.) is not sufficient to destroy their vitality. As to the poisonous effect of hemlock on the lower forms of insect life, so far from its hurting them, I never remember gathering a plant of Conium maculatum which did not swarm with insects, both as larvæ and *imagines;* and, unless the herbarium specimen is saturated with a preservative solution (*e. g.*, corrosive sublimate), they reappear, and inevitably spoil it. Conium is not the only vegetable poison which does not affect some insects. Strychnia, or at least wheat "poisoned" with it, is a feast for them; as also are Capsicum and the seeds of Hyoscyamus.—*Geo. E. Rochester.*

Entomostraca.—In this month's "Notices to Correspondents" it is stated "that the 'Fairy Shrimp' is almost always to be found in a dirty little pond on Blackheath." In case "G. R. R." should wish for more precise information as to the locality, I have taken *Branchipus stagnalis* in the pond on Blackheath just across the highroad leading to Charlton, opposite the principal entrance at the top of Greenwich Park.—*W. R. T.*

Sundew.—Could any one tell me a locality in Derbyshire for the *Drosera rotundifolia*, or Sundew? —*M. M.*

New Zealand Greenstone.—This stone within the last few years has become much more common. The New Zealand natives (Maories) of the North Island used to make a great secret of where it was to be found. A large portion has been obtained from the west coast of the Middle Island, which, until the last few years, was quite an unexplored country and inhabited by only a very few Maories. Since the gold-diggings were discovered at *Hokatika*, the whole of the west coast has been pretty well explored by diggers in search of new gold-fields, and large pieces of greenstone have been found. I myself have seen a piece weighing about 1 cwt., obtained by a digger in that locality; but it was considered to be of inferior quality, being of dark opaque green and much laminated: the kind most prized is of a pale green clouded; but some is found almost transparent. I have seen it wrought into figures or ornaments by the Maories, which they wear suspended round the neck, they also wear it in long pendants fastened through the ear by a piece of black ribbon. I have also seen meries (a weapon about fifteen inches long) made from it. During the late war the men of the colonial forces possessed themselves of many valuable pieces of greenstone. Whenever a *Hau Hau* (or rebel) was killed wearing a piece, it was taken from his ear as a trophy. It is difficult to purchase, for the Maories are reluctant to part with it, and ask most exorbitant prices. Articles made from the greenstone are handed down as heirlooms from one generation to another. I have in my possession a small piece about an inch long obtained from a rebel shot at *Pungarehu* (Patea district) which the Maories have valued at 30s. or £2. A common ornament worn from the ear is a shark's tooth also suspended.—*T. R.*

Storm Glass.—Since writing to you last month I have tried the following receipt with complete success. Camphor, 272 drachms; nitre, 38 grains; sal ammoniac, 38 grains; distilled (or boiled) water, 9 drachms; rectified spirits, 6 drachms. Water to be added last. When mixed, warm it before the fire. Add a little more water or spirit, till the sediment assumes the requisite appearance.

Volvox and Water-fleas.—I do not know if it is satisfactorily settled to what kingdom the volvox belongs; perhaps the following may help. Do water-fleas subsist on animal or vegetable substances? I have seen several fleas contain small volvox, and others feeding on them, it taking some minutes to get them between their shells, they appearing to push the volvox against the side of the aquarium. If the fleas only take animal food, I think it will be sufficient to show clearly to what kingdom the volvox belongs.—*A. G.*

Egg within Egg.—Is it a usual thing to see a duck's egg with two yolks, and inside one of the yolks another small egg—a perfect egg, shell and yolk—about the size of a pigeon's egg? I have the shells of such an egg by me just now.—*A. Hawkins*, 14, *Fair Street, Cambridge.*

Double Egg.—Yesterday one of my servants, on opening a hen's egg, found another egg within it. The inclosed was about the size of a robin's egg, with a well-formed, slightly rough shell. It lay in the white. The parent egg was full formed and was eaten. I heard of it on arriving home, and secured the small one. It has not yet been opened.—*E. L. S.* in *American Naturalist*, March, 1868.

DOG-FLEAS.—The *best* remedy is that suggested by Wood in his Natural History, viz., Persian Powder, or, as it is commonly called, the Persian Insect Destroyer; one packet suffices for a good-sized dog. The powder should be well rubbed in all over the skin; or if the dog is small, it may be put into a bag previously dusted with the powder; in either case the dog should be washed soon after. I have tried it, and found it an unfailing remedy.—*T. G. P.*

DOG-FLEAS (p. 92).—A solution of common soft-soap, in warm water, will effectually rid a dog of fleas. The soap must be rubbed well in, behind the ears, between the legs, &c.; so as to leave no vermin untouched. Dog washings are usually too superficial, and fleas are thereby left behind to restock the animal.—*W.*

DOG-FLEAS.—L. P. will find in Naldire's Tablet exactly what he wants; the soap being instantaneously fatal to the fleas, without being at all injurious to the dog. Can be had at Messrs. Barclay & Sons, 95, Farringdon Street.—*C. L.*

THE best way I know of to rid a dog of fleas is to make a strong decoction of tobacco in water, and to wash the dog well with it; or another way is to make the dog sleep on a bed of pitch pine shavings. —*F. Stanley, Margate.*

DOG FLEAS.—The following receipt will I think be found useful in keeping dogs free from lice, &c. Macerate one ounce of Shag Tobacco and one drachm and a half of Socotrine Aloes in half a pint of boiling water for a short time, then filter the liquid, and add fifteen grains of Corrosive Sublimate and one ounce of Hydrochloric Acid. The mixture is to be well rubbed on the dog's coat.—*F. M. Holmes.*

NOTASPIS OBSCURUS.—Can any one tell me how to get rid of the little mite *Notaspis*, so destructive to cucumber and melon plants in frames? I have tried almost everything, sulphur, tobacco, quicklime, laurel leaves, &c., but without success.—*A. G. T.*

OLD RED AND DEVONIAN.—At the March meeting of the Exeter Naturalist's Club the Rev. W. S. Symonds read a paper on the "Correlation of the Old Red Sandstone of Herefordshire with the Devonian of Devon," during which he remarked: "As far as the physical structure of the Old Reds of Somerset and Devon can be depended on, I am inclined to agree with Professor Jukes, viz., that those rocks which underlie the Devonian slates belong rather to the Upper Old Red than the Lower. I have never seen any mineralogical or lithological character in them which would induce me to correlate them with the Lower Old Red of the Silurian country on the other side of the Channel; while on the other hand there are a series of red and brown grits interbedded with grey slaty stone, which much resemble the brown stones of Brecon and Carmarthen vans, beds which underlie the Old Red Conglomerate, and the yellow beds, and Carboniferous shales. I incline to the opinion, formed from the aspect of the real Old Reds of the Devonian sections, that the Devonian slaty rocks are all newer than the great mass of the Old Red rocks which lie between the upper Silurians and the Brownstones of the Brecon vans."

BEES.—Will some correspondent learned in bees, kindly give the principal specific differences between

Apis mellifica (the English Honey Bee).
„ *ligustica* (the Italian ditto).
„ *fasciata* (the Egyptian ditto).

All these species (if they are separate species) are now cultivated in Great Britain. When were the two last introduced?—*S.*

ERRATA.—In the paragraph "Resin *versus* Balsam," in our last, "benzoin" should have been "benzole," and "ferments" is a misprint for "permeates."

PARSON BIRD.—Your correspondent T. P. Barkas is entirely misinformed as to the habits of the Parson Bird. Having been a resident in New Zealand, I have examined and watched the bird often, both dead and alive, both confined and free; I have listened for hours to its beautiful melodious natural notes running in ascending scale, and have heard its wonderful powers of acquired art, sweetly whistling tunes and speaking words as well as a taught starling. Its beak is beautifully formed, slender and delicate for the size of the bird, which is usually about the size of our starlings, but a little longer in the back, and a much longer tail. Its tongue is capable of extension and is beautifully brush tipped, as if for manipulating the honey and insects from the interior of flowers, and at this work I have often watched it. The New Zealand flax, *Phormium tenax*, flowers every third year, except in colour something like a gigantic gladiolus, the flower-stalk often ten feet high, and full of bells or cups, which contain a large quantity of honey, and the Parson Bird (Tin of the natives), *Prosthemadera novæ seelandiæ* (G. R. Gray), may be seen feeding from them and singing the while. It is a bush bird and lives among the trees, and is very fond of the flowers and fruit of the fuchsia, an indigenous tree there of twelve to fourteen feet high. I never saw it on a beach, although as the bush of New Zealand often comes down to high water mark, it may occasionally descend to the sands. Its coat is of a metallic black lustre, tinged with dark olive green. Its white tufts, whence its name originates, if I remember right, consist of two white feathers on each side its beak; they are beautifully curled like miniature ostrich-tail feathers, very delicate and about three-quarters of an inch long. I find I have tufts from a bird I shot, and they consist of several feathers on each side. The Tin is so beautiful a bird, such a melodious warbler, and feeds on such delicacies, that I feel bound to rise as its apologist when accused of gross feeding and artful tricks, which are anything but natural to its pretty tongue and beak and entire formation.—*J. Thompson, Higher Broughton.*

ANTS.—Our grounds are overrun with ants: enormous black ones sit up on their hind legs and defy you if you go near them. Small yellow ones, and also other kinds almost invisible, surreptitiously crawl all over you if not on your guard. Boiling water, powdered lime, and insect powder, rather refreshes them than otherwise, and we should be very glad to know of any means to exterminate them.—*K. K.*

FRENCH DICTIONARY OF SCIENTIFIC TERMS.—Can any reader tell me whose is the best French and English Dictionary of terms and names belonging to Natural History?—*J. L. M.*

"What's in a Name?"—Mr. Spicer's explanation of the name "Jocko" in connection with monkeys induces me to ask whether the name "Polly," so generally given to parrots, is traceable to any similar origin? Perhaps some reader may enlighten me.—*B.*

Novel Friendships.—A curious instance of this has just occurred among our pets. A cat, being likely to increase the feline population, selected for the purpose the nest of a sitting hen. Finding her curled up on the back of the hen, I removed the latter and left pussy in possession. Next day she came to me in a state of excitement, evidently wishing me to understand that something was amiss; she led me to the nest, where I found the hen had again taken possession, and was, with great pride, nestling two kittens under her wings. On again removing her, pussy quickly seized her little ones, and conveyed them to another place. Some little time since a Bantam hen laid her eggs in the midst of a brood of kittens, and commenced to sit on them, being by no means discomposed by the romps of her merry neighbours.—*E. C.*

Scarlet Rose.—J. R., Cae Wern, writes to the *Gardener's Chronicle*, March 14th, page 268: "A gentleman who professes to have studied only the Book of Nature informs me that a scarlet rose cannot be produced, because there are no yellows in the class. He contends that what are called yellow roses are not really yellow, but have all a 'white ground,' and, consequently, the scarlet rose cannot be produced."—*D. J., Clydach, Swansea.*

Tadpole out.—While taking a walk on March 15th, I was surprised to see in a stream a tadpole which had just emerged from the spawn. There was a quantity of spawn in the place, but my friend was apparently the first of the family hatched. Surely this was rather early.—*F. O. M.*

Holly Berries Poisonous. — Mr. George Newlyn has written us a long letter in reply to Mr. Elliott, and in defence of his first communication. As our space will not permit of our fostering such discussions, we can give only a summary of his observations. He says, not only do birds eat holly berries, but the leaves and berries of the yew, which are fatal to man, are devoured by poultry with impunity. Other animals will browse on the water hemlock and water dropwort, both of which are poisonous to man. Why these plants are deleterious to some animals and harmless to others, I leave for men of science to explain. He adverts to poison and medicine as being terms relative to the use or abuse of the agent: that which may be employed in small quantities as a medicine, becomes a poison with the increase of the dose. The writer also encloses a copy of the paragraph from the *Chelmsford Chronicle* of February, 1859, concerning a case of poisoning by holly berries. A child, after eating twenty or thirty berries, was taken ill and died, and the verdict of the jury was "Died from inflammation of the stomach caused by eating a vegetable irritant." Mr. Newlyn undoubtedly makes out a case that the eating of a few holly berries has proved poisonous to children. Here the subject therefore must close; and we must add, we do not believe that Mr. Newlyn had any idea of writing a sensational paragraph when he penned his first letter, but simply contemplated furnishing a wholesome caution.

Folkestone Natural History Society.—We are glad to be able to chronicle the formation of another Natural History Society at Folkestone, a neighbourhood where the members will find plenty to do.

Recording Anemometer.—I remember having seen in some scientific work, about twelve months ago, a description of a recording anemometer suitable to fix above the roof of my house, the indications of which could be taken in a room on the ground floor. The instrument was an adaptation of Mr. Romney Robinson's pattern. Can any correspondent inform me where such an instrument can be procured, and at a moderate price; and give any practical suggestions based on experience of its working?—*W. Lane Sear.*

Cry of the Water Boatman (*Notonecta*).—Has the Notonecta been noticed to give a cry or call? I ask because about a month ago I captured several specimens, and placed them with a little weed in a very small aquarium (by themselves) in the window. The second night after I was much surprised by the shrill cry of a cricket (never heard one in the house before), and all the more so as the sound came, not from the fireplace, but the window; and was at last clearly proved to come from the aquarium. The sound is as loud as any cricket I ever heard, and they are induced to repeat it by drawing the back of a knife smartly across the edge of a large teacup—the sound produced being a very fair imitation, but not quite so high in pitch. The cry is not heard every night, but on most nights: sometimes only for a few times, and at other times the whole of the evening.—*F. Watson.*

Register! Register!!—A very useful book is just published at the office of this journal to which we take the first opportunity of directing the attention of all naturalists, including microscopists. It is strongly bound, and consists of 200 pages, or more, at the option of the purchaser; these are of writing-paper ruled with faint lines, and in the other direction into columns, each column having a printed heading; and the volume is paged throughout, with blank pages for remarks, and lettered pages for index. This book is intended to form a collector's catalogue of objects which he may secure, whether birds, beetles, or microscopical objects, being so arranged that it will suit all, and contain all the information which the collector would desire to embody in such a catalogue. Smaller books are prepared to serve as rough note books in which the memoranda can be first entered, as in a day-book, and afterwards "posted up."

Royal Microscopical Society.—A very agreeable *réunion* took place at King's College on the 22nd ult., on the occasion of the annual soirée of this society. It was all that its promoters could desire: there was a profusion of objects to be seen, and as many visitors as could be accommodated looking at them. A hearty good feeling appeared to prevail everywhere, and a sense of complete satisfaction.

Beauty.—'Tis a law in botany that in plants the same virtues follow the same forms. It is a rule of largest application—true to a plant, true in a loaf of bread—that in the construction of a fabric, or organism, any real increase of fitness to its end is an increase of beauty.—*Emerson.*

NOTICES TO CORRESPONDENTS.

W. D. should have read his first communication before writing again.

E. A.—Parrots and Macaws are occasionally guilty of laying eggs in this country whilst under confinement.

F. S.—Hunting for small caterpillars. Several species perform the same acts, so that we cannot name.

A. H. T.—There is no winter without its stray butterflies, coming out at unseasonable times, occasionally even in a snow-storm.

E. H.—We really cannot cherish a discussion in our pages on "Expansive Power," as we require every inch of space for our numerous contributors.

M. H.—We *did* receive the packets alluded to.

J. H. W.—Not eligible for our "Exchange" column.

"Researches on Magnetism, &c., by Professor Reichenbach, translated by W. Gregory."—Wanted to purchase by H. W. R., Seaham.

M. M. R.—The caterpillar of a minute moth belonging to the Tineina.

A. M. D.—The "Blue Pimpernel" does not appear to be so uncommon as at first supposed.

M. B.—It is doubtful whether a child could make much progress in Botany with any book on the subject yet published. A live teacher is best for children.

A. B. F.—Rather too much "Gossip" and too little of "Science."

P.—If you read the paragraph on "Polarizing Prisms" again, you will see that you have not comprehended it in your reply.

E. D. C.—You might have seen Starlings around London in the winter, had you looked for them.

E. D. L.—Catch a caterpillar and examine it, and don't ask questions which you could easily solve for yourself.

H. G. G.—"Phillips's History of Cultivated Vegetables" may often be purchased second-hand for a few shillings.

M. H.—*Bryum inclinatum.—R. B.*

W. E.—*Grimmia apocarpa* and *Orthotrichum diaphanum.—R. B.*

M. G. C.—Undoubtedly the best work on British Algæ is "Harvey's Phycologia Britannica," of which a reissue in 52 parts at half-a-crown each is just completed. (Reeve & Co.) Nothing authoritative on Zoophytes published since "Johnston's Zoophytes," 2 vols., 8vo. (Van Voorst.)

W. F.—1. Yes, and also at Burning Cliff in that neighbourhood. 2. Newman, 9, Devonshire Street; half-a-crown.—*H. G. K.*

M. D.—We know of no work on spiders containing what you require. We do not remember that Dr. Halifax's method has been published.

O. P.—Try killing them by immersion in sweet spirits of nitre.

J. L. M.—We think that such a work is still a desideratum, but insert the query.

G. B.—With our limited space, and large range of subjects, we must be excused from fostering controversy.

E. W. W.—The leaf is that of *Leucodendron argenteum.—J. R. J.*

F. R. G. S.—Had you sent your address and full name, we would have answered your query—not otherwise.

E. S.—1st. What scientific names do you allude to? You must not expect to find Linnæan names nowadays. 2nd. What do you mean by a good scientific Natural History?—a little of everything, or a special book on anything? Unless queries are a little definite, it is impossible to answer them. Perhaps the Natural History portion of the English Cyclopædia would serve your purpose.

G. G.—Communications not inserted must be regarded as unsuitable or otherwise declined.

G. S. (Aberdeen).—The Crustacean is Risso's Shrimp (*Nika edulis*—Risso).—*C. A. W.*

W. S.—You will find shells arranged at the British Museum. A brief examination of the mode will be better than any description we can give.

S. S.—Several notes on preserving caterpillars are scattered through our three volumes. The mode suggested, as you suspect, is inflation. We know of no book on "preserving caterpillars."

F. B. (Romsey).—Undoubtedly *Ranunculus auricomus*.

M. G.—Try the remedies given for dogs in "Notes and Queries," page 118.

S. L. B.—No book containing descriptions of the British Beetles published since Stephens's Manual (1839), which may be purchased for about six shillings. "Hints for the Formation of a Fresh-Water Aquarium," published at half a crown, by the Society for Promoting Christian Knowledge, may perhaps meet your wishes. A first-class book is much wanted on this subject.

J. C.—We do not attempt the naming of six or eight objects for the same person. Any one unreasonable enough to send more than two or three, must expect to be disappointed.

EXCHANGES.

TONGUE OF DRONE FLY (mounted) for other mounted objects of equivalent value.—A. C. R., Red Lodge, Southampton.

FOSSILS from various strata, from Silurian up to London Clay, for a collection of British Reptiles.—F. Stanley, 3, Dane Terrace, The Dane, Margate.

MOSSES.—*Discelium nudum* and *Dicranum trichodes*, for stamp and addressed envelope.—Roger Scholefield, 27, Church Street, Dukinfield, Cheshire.

WATER SPIDERS (*Hydrachna*), living or mounted, wanted for mounted microscopic objects.—W. S. Kent, Royal College of Surgeons, Lincoln's Inn Fields, London, W.C.

ROCKS and FOSSILS, an extensive named collection offered for curious objects, natural or artificial. Address with list.—C. O. G. Napier, F.G.S., 8, Chippenham Terrace, Harrow Road, W.

SECTIONS OF OAK stained by *Helotium æruginosum*, commonly called Tunbridge Oak, in exchange for other objects.—T. W. W., 53, Buckingham Place, Brighton.

SECTION OF TEETH OF SAWFISH (mounted) for injections, palates, or other good objects.—T. D. R., 96, Westbourne Park Villas, London, W.

ELEPHANT'S TOOTH (portion) for good objects; also, Indian Bat Hair (mounted) for good slides.—O. Poole, Uphill, Weston-super-Mare.

RARER PLANTS of Cornwall offered for others. Send lists to R. V. T., Withiel, Bodmin, Cornwall.

RHABDONEMA ARCUATUM (unmounted) for diatomaceous earth.—W. Swinburn, 5, Rosemary Lane, Whitehaven.

PARASITES OF PIGEON (unmounted) for stamped and addressed envelope.—J. W. I., care of the Editor, 192, Piccadilly.

DIATOMS.—Twelve excellent slides will be given for a pure gathering of *Coscinodiscus eccentricus* or *Biddulphia aurita*.—J. A., 13, Suffolk Square, Cheltenham.

DEPOSIT, Perley's Meadow, South Bridgton, Maine, U.S., given for a good mounted entomological object.—E. C. B., care of the Editor.

LEJEUNIA SERPYLLIFOLIA.—Fresh specimen wanted in exchange for good unmounted microscopic objects.—J. B., 21, St. Bartholomew's Road, Camden Town, N.

BOOKS RECEIVED.

"The Popular Science Review." April, 1868. London: R. Hardwicke.

"The Quarterly Magazine of the High Wycombe Natural History Society." No. 8. Wycombe.

"Proceedings of the Bristol Naturalists' Society." Vol. III., No. 3, March, 1868. Bristol.

"The Journal of the Quekett Microscopical Club." No. 2, April, 1868. London: R. Hardwicke.

"The Naturalist's Note Book." No. 16, April, 1868. London: Reeves & Turner.

"The Naturalist's Circular." No. 23. London: Henry Hall.

"Country Life." Nos. 33, 34, 35, 36, 37.

"The Birds of Berkshire and Buckinghamshire," by Alexander W. M. Clark Kennedy. London: Simpkin & Co.

"The American Naturalist." March, 1868, Vol. II., No. 1. Salem: Peabody Academy of Science.

"The Canadian Naturalist and Geologist." New Series. Vol. III., Nos. 1, 2, 3. Montreal, 1866-7.

"Catalogue for Collectors on Mr. J. E. Harting's Plan." 200 pp., 4to. London: Robert Hardwicke.

"Working Catalogue for Rough Notes." 48 pp., 4to. London: Robert Hardwicke.

COMMUNICATIONS RECEIVED.—G. E. Q.—T. S.—T. D. R.—F. G. B.—J. W. I.—W. W. S.—H. U.—T. B.—A. G.—G. E.—C. L.—T. P.—G. C.—F. S. F.—E. A.—W. F.—F. S.—H. M.—W. G. S.—A. H. T.—W. S. K.—R. S.—P.—B.—J. E. B.—E. H.—J. B.—A. H.—S. D.—W. R. T.—M. H.—T. R.—F. S.—J. H. W.—R. H. N. B.—H. W. R.—J. B.—T. G. P.—J. P.—R. B. S.—R. T. L.—E. H.—M. M.—E. W. W.—J. A. S.—M. M. R.—H. H. O. F.—W. D.—T. C.—A. L.—A. B. F.—A.—E. D. C.—G. E. F.—J. A.—A. C. R.—M. B.—J. M. H.—R. H.—J. W.—L. M. P.—J. W. G.—H. G. G.—J. T.—J. C.—C. O. G. N.—G. S.—D. L. L.—E. D.—M. G. C.—C. E. R.—T. F. C.—G. N.—E. F. B.—T. W. W.—H. T.—R. M'L.—K. K.—W. H.—E. C.—G. B.—F. M. H.—R. V. T.—A. G. T.—O. P.—T. D. R.—J. L. M.—M. D.—M. H.—W. S.—H. A. S.—F. R. G. S.—F. W.—J. A.—F. A.—E. S.—W. L. S.—R. L.—M. R. S.—V. S.—M. P.—W. W.—E.—Mac.—H. C.—S. S.—W. S.—G. G.—J. B.—Lenna.—J. J. W. K.—F. B.—E. R.—H. W.—J. B.—M. G.—S. L. B.—Q. S.—S. M.—G. G.

THE SPRING PHENOMENA OF PLANT LIFE.

SOME one or other has written that

> The merriest time of all the year
> Is the time when the leaves begin to fall;

but we cannot, by any means, endorse the sentiment; for we believe it to be a far merrier time when the young leaves push their way out from the chrysalis-like buds in which they have lain all the Winter, and unfold themselves to the bright sunshine of Spring. The naturalist, especially, finds something to delight him in every season, and we are quite willing to allow that Autumn has its charms in all the sights and sounds of nature, and its pleasant associations in its merrymakings and harvest-homes. There is, too, a sort of lingering of the Summer weather, as if it were loth to leave us, which is very delightful; and the gardens — English gardens, at any rate — are at their brightest. The tints of Autumn are varied and beautiful, beloved of artists; but still we cannot quite throw off a feeling of sadness when we see the first tinge of brown in the foliage, like a streak of grey in the hair of those we love. Is it not a fore-shadowing of decay and death? Does it not speak to us of a time that is not far distant, when the winds will scatter the leaves, and whirl them about with a moaning sound, leaving only the bare branches rattling together, and standing out, like ghosts, against the cold sky? But to us, and we think to every naturalist, the sights and sounds of Spring are far more pleasant, and the Spring leaves far more beautiful, for they tell us hopefully of a merry time that is coming—a time of sunshine and flowers, and the songs of birds, and of pleasant evening strolls under the chequered shade. No season is so much loved and lauded by the poets as Spring; no season so calculated to make us feel happy and hopeful; no season to which we look forward with such expectation, watching for its first signs. Indeed, so eager are we to believe that the reign of Winter is over, that year after year we hug ourselves with the belief that Spring is come long before it really is. But the fact is that almost every year there is an early, false Spring, for even now, whilst we are writing, at the end of February, the sun is shining warmly, the birds are singing, a few primroses are out here and there, and many shrubs are unfolding their leaves; and we are quite content to be deceived for a time, although we know full well that the leaves will be nipped with the east wind when March "comes in like a lion," and that in all probability there will be frost, and perhaps snow, before the real Spring comes.

But apart from all poetical associations of Spring, there are certain phenomena affecting plant life that are interesting to us as naturalists, and we propose to direct attention to some of them.

To those of us who live in the country, it is a great source of pleasure to watch the progress that Nature makes in putting on her green dress. First, the landscape perceptibly thickens, and we can see by the swelling buds that the trees are waking from their Winter sleep, and that new life-bearing sap is beginning to find its way to the old branches. Day by day, and week after week, the buds increase, till at length a delicate green tinge spreads over the face of nature, and gradually deepens into the full rich verdure of Summer. In more northern countries, like Norway and Sweden, the transition from Winter to Spring is said to be much more sudden, the buds seeming to burst into leaf almost in a night,—Winter, with ice and snow, to-day—Spring, with sunshine and leaves and flowers, to-morrow; but here the green robe is donned by little and little, and many weeks pass over before the leaves are fully expanded.

It is interesting to watch the order in which the trees come into leaf, and it is curious to note how, year after year, the order is the same. First, the

Larch hangs out its green tassels, and no tree is more beautiful in early Spring, for at a distance its form is so light and feathery and its colour so pure and delicate; but it is almost more beautiful when examined closely, for nestling amongst the green tassels are seen the most exquisite little pink flowers, like very double camellias. These are the female blossoms, which afterwards become green, and harden into the cones. The male flowers are round close bunches of stamens, also very pretty. The cones take two seasons to come to maturity. The flowers of this Spring will ripen in 1869, and as they will remain on the tree for many months after they have opened and shed their seed, there may generally be found, as in many other firs, three generations of fruit at one time upon the tree.

Amongst the earliest to come into leaf are the Sycamores, and they always make a great show very quickly. No sooner do the buds burst, than they appear to be in full leaf. One reason for this is that the buds are large, and the leaves plaited and crumpled up within them in a very intricate manner, so that when liberated from their prisons they flatten out at once to a considerable size. Not so with many others in which the leaves are not plaited, but are flat, or merely folded like a sheet of paper; such when they burst from the buds are small, and must grow a good deal before they make much show.

The Horse-chestnuts, the Elms, the Willows, and all the other trees follow in their due order. The Willows are deceitful, and often appear at a distance so green that we think they are certainly coming into leaf before any of the others; but when we come to examine them, the green colour is found to be in the bark of the smaller twigs, or in the catkins, which in some kinds appear before the leaves. The Oak and the Ash bring up the rear, the Oak being generally in leaf first; but now and then the Ash is the earliest, and when this happens it is supposed by the wise old folk in country places to indicate a very wet summer.

There is great diversity in the colours of the young leaves of different trees. The foliage of the Beeches is almost emerald green; the Sycamores and Horse-chestnuts are of a darker and richer hue; the Willows wear a bluish tint; and the Oaks are of a yellow green, often with a brown or a red tinge. All these, mingling with one another, and with the dark sombre foliage of the evergreen firs, give the woods a charm and a variety that is one of the most beautiful features of Spring.

A beautiful vernal phenomenon is seen in the way in which different leaves are folded up in the buds. This, which is called from the season, the *vernation* of leaves, may be well observed by cutting across the buds with a sharp knife. The vernation will be found to be very different in different plants. In some the edges of the leaves will be rolled inwards, in others outwards; some will be folded alternately within each other; some will be rolled completely round; and others will be plaited like a closed fan. In ferns, the vernation is very beautiful, the whole frond, and every branch of the frond, even to its minutest segment, being rolled inwards. It is called "circinate," and it is a method of vernation which, with a *very* few remarkable exceptions, is confined to the tribe of ferns, and in them is so fully carried out that even the spore cases at the back of the leaves have a circinate form.

The way in which the delicate young leaves are protected in the bud cannot fail to strike us as being very beautiful and effectual. Generally, a number of dry tough scales grow either around them or amongst them, the edges of which overlap each other, like slates on a house, forming a complete case around the embryo leaves. The surface of these scales is generally highly polished, so that the rain runs off them without penetrating; and often they are coated with a resinous varnish, which makes them still more impervious. The scales are in many cases the stipules of the enclosed leaves. Watch the expansion of a bud of the Lime-tree, and you will see this very plainly. The progress of the bud is very beautiful as each pair of stipules unfolds, and the young leaf to which they are attached is liberated. The scales grow with the leaves for a few days, and then fall off, being of no further use. Watch the unfolding of a Horse-chestnut bud, and you will see that as the young branch grows, the leaves have no stipules, but the varnished scales remain at the base of the branch, and are not carried up with it. In this case they are considered to be different organs, and are called *perules*.

Now examine a bud of a Beech-tree as it expands, and you will see how each leaf is embedded in a soft cushion of silky hairs. Not many days elapse ere the hairs fall off the young leaves, showing that they serve some purpose within the bud that is not required by the mature leaves. The hairs in Beech and other buds are, doubtless, intended for the protection of the young leaves, either by supplying warmth, or to attract moisture, or electricity, or perchance to prevent the closely-packed young leaves from injuring each other; but in whatever way they act, we may be quite sure they act beneficially, else they would not be there.

In some of the earliest of the Spring flowers we see a number of special contrivances, if we may so call them, to ensure the protection of the seed. The Coltsfoot, which flowers in February, and ripens its seed very quickly, at a time when the weather is generally very inclement, is a beautiful illustration of this. The seeds of this plant, as of all other composite plants, are naked, or rather the thin capsule becomes part of the seed, and the latter has not the protection of a seed-vessel, and is, there-

fore, still more likely to be injured. When, however, the flower has opened to the sunshine, and the stamens have shed their pollen, and the florets begin to wither, the involucre closes tightly on the young downy seeds, completely concealing them; but not only so, the flower-head, erect hitherto, bends downwards, so that the scales of the involucre form a beautiful canopy over the delicate seeds, and thoroughly protect them. Thus they grow and swell till they are ripe, or nearly so; when, lo! another wonder. The stalk again becomes erect, and the ripened seeds are again exposed to the air and sunshine. The feathery down is soon dried, and the wind blows the seeds away, and sows them on new ground.

The Strawberry-leaved Potentilla (*Potentilla fragariastrum*) is one of the very earliest of flowers, and its seeds, like those of Coltsfoot, are apparently naked. But as soon as the petals have fallen, the double calyx closes again, and the seeds are safely shut up, as if in a bud or a seed-vessel; besides which, the plant is not only an early bloomer, but it flowers all through the summer, so that if the early seeds are injured, the later ones are sure to ripen.

Another very early flower is the lesser Celandine, *Ranunculus ficaria*, which propagates to such an extent by offsets that it apparently matters very little whether any seed ripens or not.

Gorse flowers as early as January, but its seeds seem to be protected at first by the velvety texture of the carpel supplying warmth, afterwards by the hardness of the pod; besides which, though flowering so early, the seeds do not ripen till late.

The economy of the Crocus is very beautiful. If a flower be examined, there is apparently no ovary at all, but in reality the part which we took for the stalk is the tube of the flower, and its base, containing the ovary, is close upon the top of the bulb; so, deeply buried in the ground, and safe from all the changes of the weather, the seed is being matured, until, after the coldest weather is over, it pushes its way upwards, and appears above the surface, where the process of ripening is soon finished in the influence of the warm sunshine of May.

Several of the earliest of the spring flowers come out a long while before the leaves. A beautiful yellow Jasmin, *Jasminum nudiflorum*, Mezereon, many willows, many plums, almonds, peaches, and apricots are all of this class; whilst the Colchicum and the autumn Crocus flower so *very* early, that they are waking up when others are going to rest—their spring-time being in the autumn. The reason of these plants flowering before they are in leaf is not very apparent. Possibly they would not have time to mature their seeds unless fertilized thus early. Possibly their flowers require a full glare of light, and would be injured by any shadow from leaves. But whatever be the reason of their peculiar economy, they supply bees and other insects with early food, when food is especially wanted by them; and perhaps, after all, this may be just the reason why the Good Creator, mindful of the least of His creatures, has given them these unusual habits. A very pretty vernal phenomenon arises out of the decay of the autumn leaves. It is a very common thing to find in the spring skeletons of the last year's leaves that have been exposed to the frosts and rains and winds of winter, till all the soft parts have decayed away, leaving only a network of fibres. These skeleton leaves, when perfect, are very pretty, and they may be made still more beautiful by being bleached in a *very* weak solution of chloride of lime. Poplar leaves and holly leaves are the most frequently found skeletonized naturally, but almost any leaf, and many fruits, seedpods, and parts of flowers may be operated upon artificially by soaking them in shallow pans of *rain*-water, and turning them very often, until the pulpy part which lies at each side and between the fibres is sufficiently decayed to allow of its being washed away by holding in a stream of water; any pulp that remains must be picked off by some sharp-pointed instrument. Much patience, care, and delicate handling is required, but when successfully managed, a group of skeleton leaves and fruits is one of the most beautiful ornaments for the drawing-room that can be conceived.

None of the phenomena of Spring are more wonderful than the germination of seed. Every seed consists of an outer skin, called the *integument*, and a baby plant, or *embryo*, which is swathed up in the integument. The embryo consists of seed leaves called *cotyledons*, and a *germ*, or bud, which afterwards lengthens upwards, forming leaves, and downwards forming roots. The embryo is a living body, but the vital force remains latent until the conditions are fulfilled which are capable of calling forth the hidden life. Those conditions are a certain amount of heat, moisture, and air.

In some plants, like the Sycamore, the cotyledons are green and leaf-like even when rolled up in the seed, and as soon as they expand serve the ordinary purposes of leaves. In others, like acorns, beans, and peas, the cotyledons are thick and solid, and filled with starchy matter, being a storehouse of food for the young plant. Sometimes the embryo is surrounded by a quantity of albumen, as it is called, which also supplies food to the young plant. In the grass tribe this albumen occupies by far the largest part of the seed.

When a seed is buried in the soil, it starts into life, or rather its latent life becomes active under the stimulus of heat, air, and moisture. The germ begins to grow, bursting through the integument, and pushing a delicate root downwards into the soil, and a tender shoot upwards into the air. Both are very tender, and unable to draw sufficient nourishment from the soil and the air, but Nature has

stored up in the cotyledons and the albumen enough food to nourish the young plant for a considerable time. This food consists chiefly of starch, which being insoluble is not yet in a fit state for absorption. As soon, however, as growth begins a gelatinous substance called *diastase* is formed in the seed, and this acting upon the starch gradually converts it into gum and sugar; these being both soluble, are absorbed by the young plant, which grows quickly on such nutritious food.

When this supply of maternal food (as it may not inappropriately be called) is exhausted, and the young plant has to obtain all its food from the soil, it very often looks sickly, and becomes yellow; and this has been called by some of our old farmers—somewhat poetically though very truly—"the young plant pining for its mother." It is not our desire now to tire our readers with preaching and moralizing, but we should be blind indeed if we failed to see that there are prefigurations and similes in Nature; and that not the least beautiful and appropriate simile is that which likens Spring to childhood, when all Nature appears innocently beautiful, and the young leaves and young flowers are beginning the work of their life, which will only have its full completion in the golden fruits of Autumn. And we cannot close this paper without calling to mind one other thought that is suggested by the phenomena of Spring. In Autumn we are sorry to see the leaves falling and the flowers fading, but we rejoice to know that we shall only lose them for a time. So when *our* autumn of life shall come, we may take comfort from the recollection that for us, as well as for the flowers, there will be a new spring when the winter of death is past.

Mobberley, Knutsford. ROBERT HOLLAND.

THE GOSSAMER.

ON a bright calm day, about the middle of last October, the Gossamer was in flight on the South Downs, and in the afternoon the ground was covered, as at Loughborough a little later, with "a shining veil."* The spiders were in great numbers, of a dark colour, and of different sizes, but not more so than might be accounted for by a diversity of age or sex: a few were secured with a piece of web for further examination, and they may now, perhaps, afford some particulars to meet Mr. Mott's inquiry, "what is the power" which drives the spider through the air? It has been held that the Gossamer is the young of the common garden spider, but a close examination will prove this to be a mistake. The general form of both is the same; but the Gossamer, unlike the other, is fitted out at all points as an aeronaut; the legs, furnished at their extremities with combs, but reduced in their proportions, and brought nearer to the form of hooks, and the hook underneath and between them largely developed; the part of the abdomen near the spinning apparatus, and among and upon the spinnerets, furnished with stiff curved hairs, like grapples, to give the adventurous traveller a firm seat upon the web. But it is in the form of the spinneret itself the chief difference lies. It is a double, not a single cone. The lower one, a strong muscular-looking sac, is surmounted by a smaller cone pierced by numerous tubes, from which the threads of the web may be projected, by the contraction of the sac, at the will of the insect.

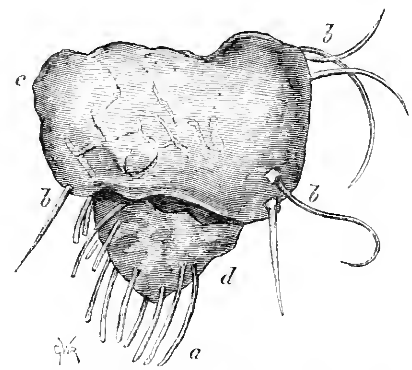


Fig. 112. Spinneret of Gossamer. *a*, Tubes; *b*, Hairs; *c*, Sac; *d*, Cone, + 300.

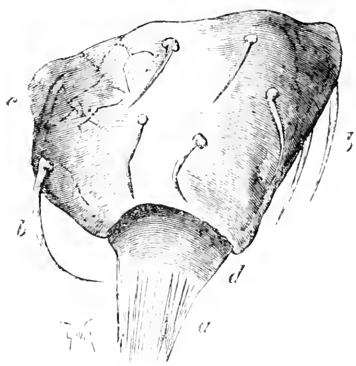


Fig. 113. Another Spinneret of Gossamer. *a*, Tubes; *b*, Hairs; *c*, Sac, + 300.

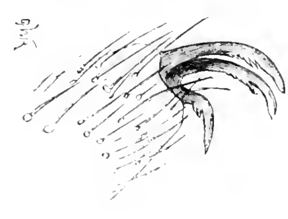


Fig. 114. Claw of Gossamer × 300.

The subject of the flight of the Gossamer has been often discussed, and there are some very

* See SCIENCE-GOSSIP for last March, p. 51.

entertaining pages in Kirby and Spence's Entomology, under the head of "The Motions of Insects," bearing on it. These, however, are mainly occupied with the detail of facts proving, what is now admitted, that they rise into and float through the air by means of their webs. Only one suggestion is made which appears to approach the explanation of the power by which this is done; for that it is effected by "magic," or by "some subtle electric influence," may be passed by. The suggestion is that it may be caused by the emission of a current of air. This from so small a creature, without a suitable apparatus, seems impossible; but that the air has something to do with it is not so unlikely. The downward rush of numerous threads from all the spinnerets at once against the current of air, steadied and in some measure aided by the contact of the floating web, is presumed to be the motive power which throws the spider forward "like a flash," or with less speed in proportion to the force exerted. The application of a similar power in another element is seen in the larva of the dragon-fly; and most are familiar with the flight of the sky-rocket, which mounts with astonishing force by the downward impulse of the escaping gases. The web is a loose structure, and, even where thinnest, is made up of numerous threads, having no coherence; like an untwisted skein of worsted, it is easily flattened or distended, as it often is, probably by the exertions of the insect, and so made more buoyant.

If there be any truth in this explanation, it is due to the power and definition of our modern microscopes, of which the higher powers must be used. Many vain speculations would be saved if the organs by which any wonder is effected were first carefully examined. It is hoped that some further observations on this difficult subject will be made, and recorded in Science-Gossip. S. S.

NEW INFUSORIA.*

By J. G. Tatem.

It is hoped that a few short notices of some of the rarer species of Infusoria, either hitherto unrecognized as indigenes, or so seldom met with as to be presumably unknown to the great majority of microscopists, if accompanied by accurate drawings, would not be unacceptable to the members of the Quekett Club.

It is to be regretted that the living creatures cannot themselves be exhibited. These "rari nantes gurgite vasto," however diligently searched for, are not usually obtainable in numbers, and are still less readily procurable just when they may be desired. I cannot, therefore, expect that an opportunity of submitting any of them to your examination will be afforded. The drawings, however, taken from the objects themselves by means of the neutral-tint reflector, with the utmost attention to accuracy of outline and completeness of detail, will, I trust, serve to convey a sufficiently correct idea of them.

I. *Chætospira Mülleri*, "found hitherto in the open cells of torn leaves of *Lemna trisulca*, growing in fresh water near Berlin," is occasionally obtained from the ponds and ditches of this neighbourhood (Reading), but so far as my observations extend, it selects in preference those of the frond and rootlet of *Lemna minor*. The flask-shaped sheath is wholly immersed within the frond, the internal cell-walls of which are broken down to afford it the required accommodation, and secure the animal, in addition to its own horny sheath, the further protection of the cuticle of the plant. The ciliated feather-like spire alone projects, and when fully extended makes a complete turn. The terminal cilium is somewhat the longest. A small opening, presumably the oral orifice, may be detected at the base of the spire.

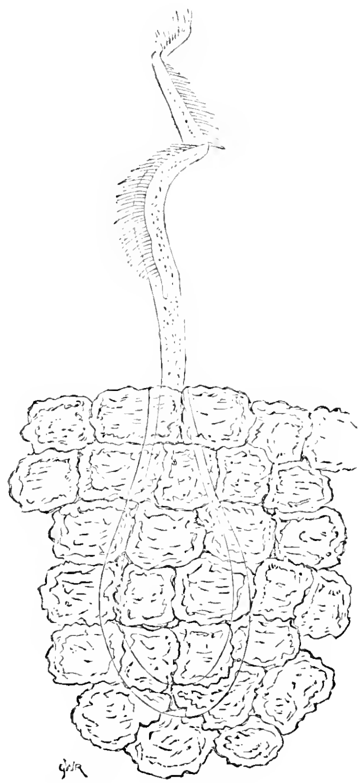


Fig. 115. *Chætospira Mülleri* × 380.

Though mostly solitary, more than one is sometimes found in the same frond. On one occasion a group of five small specimens was met with, lodged

* Read at the Quekett Microscopical Club, March 27, 1868.

in adjoining cells of a Lemna root. To accommodate themselves to these narrow quarters, their sheaths were placed in the vertical direction,—that of the cells, their spires being thrust out at right angles.

The *Chætospira Mülleri*, though now, I believe, for the first time announced as a British species, will prove, I have little doubt, by no means a rare one. Small, extremely sensitive, retracting within its sheath on small disturbance, slow to emerge from it, and concealed within the Lemna, it may readily be overlooked. I am persuaded, however, that a diligent search for it would be rewarded by its detection in many other localities besides the immediate vicinity of this town.

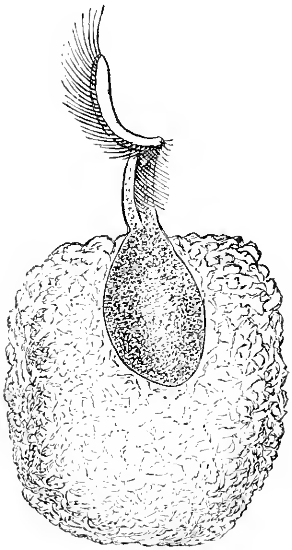


Fig. 116. *Chætospira mucicola* × 380.

II. *Chætospira mucicola*, a more common species in this locality than the preceding, is invested with a mucous covering, and is found on, and not within, the Lemna or other aquatic plants. Shorter and more compressed, the spire makes but a half-turn. The first cilia are longer than the rest, the extreme cilium being the longest.

III. *Tintinnus Cothurnia*.—In the pools, on filamentous algæ, below the castle rock at Hastings, and still more abundantly in a broad ditch of brackish water which extends for some distance parallel with the road leading from St. Leonards to Bexhill, this Baltic species of Tintinnus was discovered. "Hyaline, with a cylindrical hyaline indistinctly annulated sheath, rather attenuated and truncated at the posterior end," is Pritchard's brief, and (with the exception of the annulation, which I have altogether failed to observe) sufficient specific description. Transparent, cup-shaped, with a patulous mouth, surrounded by rather long cilia, a flexible pedicle attaches it to one side of the sheath, rather more than halfway down, and to this point of attachment, closing its ciliary wreath, it retreats when alarmed, or on occasions of greater disturbance, much below or quite to the bottom of the lorica. It may be presumed that this retraction is effected

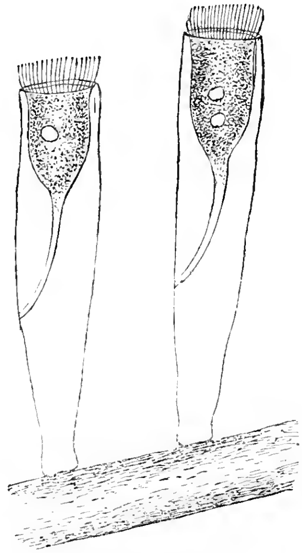


Fig. 117. *Tintinnus cothurnia* × 380.

by a muscular band, as in Vorticella, but such band has not been observed. In extension, the cilia aone project beyond the sheath, and are plied with

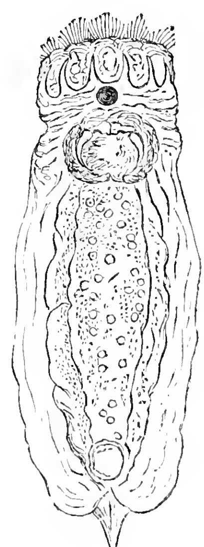


Fig. 118. *Anuræa heptodon* × 380.

great vigour, the vortex created being proportionably extensive. With the available magnifying power (a quarter-inch), nothing beyond one or two

food vacuoles and a few greyish granules could be detected within the clear sarcode. Sessile on filamentous algæ, it is readily detached, and it then swims freely—indeed, with great velocity—through the water. It is a lively and interesting little creature, and the attention of the microscopist visitor to Hastings and St. Leonards is claimed for it. He will doubtless have but little difficulty in procuring it from either of the two localities mentioned.

IV. *Anuræa heptodon.*—To the description of this species, at p. 707 of Pritchard's "Infusoria," I have nothing to add. In the summer of 1865 it was found in some plenty in the moat surrounding Southcot Manor-house, near this town.

Three of the four species of which drawings and descriptions are now presented, are, it is believed, new to the British fauna. The researches of those members of the Quekett Club who are more especially interested in the study of the Infusoria, will no doubt prove that they are to be found, and perhaps in greater abundance, in many other localities than those which are here indicated.

MARGINAL VENATION.

In the number of Science-Gossip for May, your correspondent, "T. W. W.," Brighton, makes some comments on a paper of mine which was read before the Royal Microscopical Society of London in November last, and published in the *Quarterly Journal of Microscopical Science* in January of this year, on a peculiar distribution of veins belonging to leaves of the natural order Umbelliferæ, and in which the existence of a vein at the very edge of the leaf was shown to constitute the peculiarity.

Your correspondent takes exception to the notion that this kind of venation is confined to the Umbelliferæ; but if he will take the trouble again to peruse the paper, he will search in vain to find that I assumed this to be the case, though I admit that such an interpretation might be put on the general bearing of the paper, which a different wording might have prevented.

To have given prominence to the existence of a vein which I had never before seen myself, after many thousands of experiments on the venation of leaves, was natural; but to have turned up the vein in question in such a large number of leaves belonging to the same order, and to have had my own conclusions endorsed by some of the first botanists and microscopists of the day, furnished, I conceive, a still further inducement to assign to the *order Umbelliferæ* what was its due; and further, to withhold from other orders a character which had not yet been found to exist in one even of their species, much less to constitute a prevalent characteristic of even a group, and still less of half an order. Such a conclusion was strengthened, moreover, by the supposition that if a vein in such a position of the leaf had been found at all largely distributed amongst plants generally, it would have been detected by the botanists long ere this, and some notice of it would have been found in their works.

Now that attention has been directed to the existence of such a vein, it is not improbable that it may be found in many leaves of different families; and while I would not confine it to the particular group in which I have so constantly found it, still it can scarcely be expected to be discovered in the same relative proportion of plants in any other. It stands out, therefore, prominently amongst the Umbelliferæ, and this is all that was intended to be conveyed as to confining it to this or any other order.

Your correspondent will perhaps allow me to offer one or two suggestions for his guidance, which I trust he will receive for what they are worth and as they are intended. It would appear to me, then, that if "T. W. W." wishes to extend his observations, and make them really useful, he should make himself acquainted with what has actually been done in the organography of flowering plants; by so doing he would familiarize himself with all the varieties in the venation of leaves which have been hitherto discovered and classified; neither should he rest satisfied until he has worked up the course and distribution of every vein typical of each class. Unless this plan be adopted—and your correspondent's short critique on my paper shows that it has not—"T.W.W." will be constantly finding something which has been found before, and pluming himself on a discovery; or, and what is worse, he may expose his inability for original observation by describing inaccurately that which he is investigating. "T. W. W." furnishes an example, indeed, of this loose way of experimenting in his description of the Myrtle leaf, in which he confounds a vein *near* with one *at* the margin of a leaf. The Myrtle leaf, he says, "under liquor potassæ gave a *marginal vein*." Now this leaf, as is well known, has no marginal vein at all, but is an example—and, indeed, the type—of that kind of venation first described by Lindley in the seventh division of his classification, viz., the Pseudo-costatum, or Falsely-ribbed leaf, in which the *curved* or *external* veins, both or either, become confluent into a line parallel with the margin, *as in all Myrtaceæ.* So that "T.W.W." has unluckily chosen a leaf typical of one kind of venation in order to illustrate another kind altogether distinct. It is not common to find this kind of venation amongst our indigenous plants, but there are some fine examples amongst the exotics, as in *Caladium atro-sanguineum*, Caoutchouc, *Bupleurum fruticosum.*

Again, "T. W. W." remarks upon the separation of the fibro-vascular tissue of the Myrtle leaf into

two parts. The "veinage," he says, "consisted of two laminæ;" and asks "whether botanists have observed a similar state of things with other leaves." Here, again, a little more anatomical knowledge would have informed him that not to be able to separate the bundle of woody tissue, of which the vein is composed, into an *upper* and *lower* layer would prove the exception rather than the rule. For in the anatomical structure of the leaf, the fibro-vascular tissue (vein) proceeding from the medullary sheath, after having passed from the origin of the leaf to its extremity, doubles back upon itself, forming underneath the first a new layer of fibre, which finally discharges itself into the *liber*. So that the bundle of woody fibre which forms the framework or skeleton of the leaf communicates above with the medullary sheath, and below with the *liber*. The double layer of fibro-vascular tissue is also perceptible in a leaf which has lain during the winter in some damp ditch. When its cellular substance is decayed, so that the cohesion between the upper and lower layers is destroyed, they can then be easily separated. The curious Indian leaves which have the property for opening on slight violence like the leg of a silk stocking, so that the hand may be thrust between their upper and lower surfaces, derive that singular separability from an imperfect union between the excurrent and recurrent fibre.

The strong impression entertained by "T. W. W." that the marginal vein will be found in many deciduous plants, will, I conceive, be materially strengthened when he has found this to be the case; until then, his negativing the idea that it is peculiar to the Umbelliferæ remains harmless, and simply stands for what is worth—*an impression*.

Before concluding, I may be allowed to remark that it is likely a considerable number of leaves will be found amongst different orders of plants in which a vein at the very edge will manifest itself. I have before me descriptions of more than one hundred leaves, not of the umbelliferous group, in some of which the vein in question is distinct and unmistakable. *Not even two, however, in one order yet.* It is the finding it in large numbers in one order that gives character to that order.

I notice it in the Box, of which some descriptions of leaves no less than one inch and three-tenths in length are in my possession; in the Holly and the Barberry; and it is beautifully displayed in the expanded shoots—formerly considered leaves—of the Butcher's Broom (*Ruscus aculeatus*).

It is to be hoped, therefore, that the insignificant number furnished by "T. W. W.," and already known to myself, may increase, so that the marginal vein may ere long become dignified by having a class of its own.

The plan of boiling leaves in liquor potassæ is one which is well adapted for procuring their skeletons easily and expeditiously. It will be found in practice, however, that there are scarcely two different leaves that bear the same amount of boiling. What would just suffice for the Box, for instance, would disintegrate the Myrtle into shreds, and what would spoil the Myrtle would scarcely affect the Barberry. But as it is only by experiment that the proper time for keeping a leaf in the boiling fluid can be ascertained, it is but to leave this to those who may wish to prosecute the inquiry for themselves.

Finally, the skeletons of those leaves which are so thick and opaque that the microscope fails to develop their modes of venation, are those which more particularly demand dissection for the purposes of description and classification. The more transparent leaves may be entrusted to the microscope. John Gorham.

Tunbridge.

THE ALIMENTARY SYSTEM OF A HOUSE SPIDER.

TEGENARIA CIVILIS, the anatomy of whose alimentary system I am about to describe, belongs, as do most of the animals popularly termed "spiders," to the family Araneidæ of the Arachnida pulmonaria or filosa.

Although all my observations will refer more particularly to the species I have chosen for illustration, many of them might with propriety be applied to any other member of the Araneidæ. But in such a large family as this there are in every genus minute differences of structure, the description of all of which would far exceed the limits of a short article. I therefore thought it better to confine myself to one in particular, in place of trying to take a cursory view of the whole.

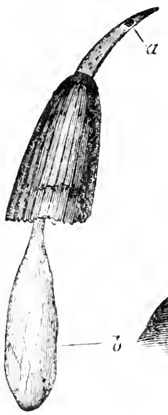
I have chosen the Tegenaria civilis as the basis of my remarks for several reasons, but chiefly because it is a very common, if not the most common, of our British spiders; and there must be few of my readers who have not seen it lurking in its web when they were moving some old article of furniture, or visiting some remote garret or lumber-room, and thus have acquired a knowledge of its general appearance at least.

The term *alimentary system* I have employed in its widest sense, including in it all organs directly or indirectly subservient to the nourishment of the animal—such, for instance, as the spinnerets, from which are eliminated those wonderful webs in which the spider snares its prey.

With these few words of preface, I will now proceed with the immediate subject of my paper, and commence by describing what are called the "falces."

The falces are a pair of jaw-like organs situated immediately above the mouth; they are at-

tached to the forepart of the cephalo-thorax by a joint, and have a lateral motion like the jaws of insects. These organs perform somewhat the function of mandibles, and have in fact been so called by some authors, but improperly, for they form no part of the mouth. Their function is to seize and kill the prey, but they do not assist in mastication.



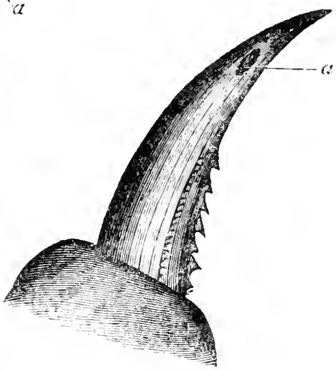


Fig. 119. Falx, with poison gland attached. *a*, Fang; *b*, Poison gland.
Fig. 120. Fang magnified, showing exit of poison duct. *a*, Exit of duct.

Each falx is composed of two parts, the base and the fang. The base serves simply as the support for the cutting instrument, and has a groove on its under surface, into which the fang is folded down when not in use. The fang is hard, sharp, and sickle-shaped, and is, in the instance we are considering, armed with a row of thirty pointed teeth on each side, and a smaller number on the under surface. Attached to the falces is a highly-interesting apparatus which is believed materially to assist the spider in the capture of its food. This consists of two glands, composed of a number of filaments, united by a membrane into the form of a sac; these are situated in the interspaces of the muscles of the cephalo-thorax, and communicate with the falces by means of a duct. These glands secrete a fluid which is supposed to possess slightly poisonous properties, and thus aid the spider in the destruction of the insects on which it feeds.

Stories are told of the poisoned bite of spiders having proved fatal even to man; these are not, however, supported by very reliable evidence. Certainly no English spider is capable of inflicting a bite sufficiently hard even to pierce the human skin; this I have frequently proved by experiment.

So far as I am aware, no experiments have been made to prove the directly poisonous properties of this secretion. Any such experiments are, in the case of our British spiders, surrounded with great difficulties. Speaking for myself, I may say that some I have made in reference to this question have been only in a measure satisfactory, but such as they were they rather tended to prove that this fluid does possess some properties fatal to insect life. The exact position in the fang of the orifice through which this fluid exudes has long been a question of dispute. Very recently a discussion took place on the point in the pages of this journal.

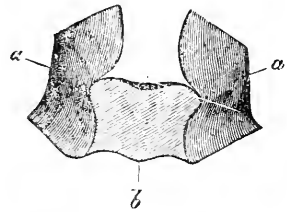


Fig. 121. Mouth. *a a*, Maxillæ; *b*, Lower lip.

Some of the disputants even went so far as to deny the existence of these glands and their accompanying orifices altogether; this would appear, however, to have been the result of faulty dissection. The dispute was closed by a communication from Mr. R. Beck, illustrated by a drawing, in which he showed the orifice as being on the side of the fang near the point. This communication may, I think, be fairly said to have settled the question.

The food which has been captured and killed by the falces is next conveyed to the *mouth*. This consists externally of an upper and under lip, and a pair of maxillæ or jaws. The upper lip can only be detected externally by its hairy tip, which is in reality merely the termination of the palate. The lower lip and maxillæ are both also covered with hair; the latter are carneous in their structure, and serve to masticate the food and express the juices, which are then sucked up by the lips.

In a cavity above the palate is a transparent glandular mass, which secretes a fluid considered to be probably, functionally at least, the same as saliva.

The mouth communicates by means of a short œsophagus with the stomach. This viscus is of a highly complicated and peculiar structure. It is broad and flat, somewhat circular in form, and possesses on each side five branching cylindrical cæcæ, which extend up to the roots of the legs and palpi. These cæcæ appear simply to serve the purpose of exposing the food for an extended period to the action of the gastric fluids.

From the stomach the food passes into the alimentary canal. This, at first narrow, expands at a short distance from the stomach, again contracts, and again expands at its extremity.

The intestinal canal is enveloped on each side by a dark granular mass of fatty tissue called the "fat-body." This substance exists in a greater or less degree in all the Arachnida pulmonaria; and when we

consider the precarious nature of their food, and the long fasts which they must consequently endure, we at once see the absolute necessity of some such internal provision for their support. That spiders are capable of existing for a long time without food has been amply proved. As an instance of the kind, I may cite the case mentioned by Mr. Blackwall, in his admirable work on British Spiders, of a female *Theridion quadripunctatum* which lived for eighteen months in a closed bottle without food.

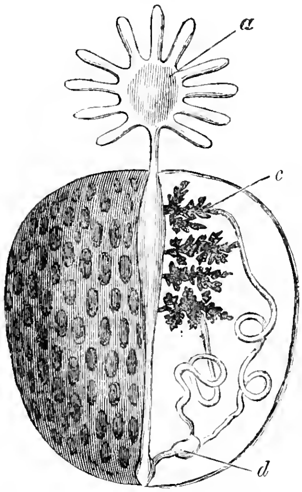


Fig. 122. *Tegenaria civilis* magnified, showing alimentary canal, &c., the fat-body being removed from one side. *a*, Stomach, with cæcæ; *b*, Intestinal canal; *c*, Biliary organ; *d*, Renal organ; *e*, Fat-body.

Embedded in the "fat-body" on each side of the intestinal canal is a series of dark glandular masses which communicate by means of short tubes with the canal at the point of its first dilitation. This is the biliary-organ. Its existence was formerly denied, it having been frequently overlooked in the general mass of the "fat-body."

Also enveloped by the fatty substance, and ramifying amongst it, are two fine tubes; these unite in a small sac which communicates by a short tubule with the intestine near its anal dilatation. The proper function of this apparatus is somewhat doubtful, but it is considered probable, and I think with reason, that it is a renal organ.

At the base of the abdomen, near its extremity, there is, resting on the surface of the "fat-body" a greyish-yellow mass. This when removed from the spider and teased out, is found to be composed of an immense number of minute tubules, ramifying from a series of small glands. These tubules expand several times during their course into small sacs, and finally find their exit in a variable number of jointed mammulæ,—in the case of Tegenaria civilis six, situated externally on the inferior surface of the abdomen. This is called the silk-secerning apparatus, and the external mammulæ are named the spinnerets.

Each mammula is studded with a number of minute orifices, through which the secretion from the tubules passes. The number of these tubules has been variously estimated at from four hundred to a thousand. In some specimens of Tegenaria civilis I examined, I found the number was about seven hundred and twenty.

It has been generally stated that the whole of the mammulæ are engaged in the formation of a single thread of spiders' silk; this, however, I am very much disposed to doubt, and, from what I have seen, I am inclined to believe that only one or two of the mammulæ are in action at one time. They are usually arranged in pairs, and I think it is not unreasonable to suppose that two act at a time, and that when the secretion supplied to them is exhausted, the next pair come into action, and so on in succession.

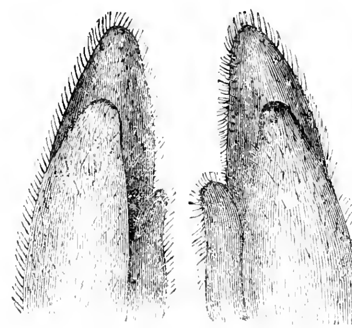


Fig. 123. Spinnerets.

The thread is of two kinds, or rather composed in two different ways, depending probably merely on the volition of the animal, there being no apparent difference in the nature of the secretion.

The first is that which forms the longitudinal threads of the web, and is simple and smooth throughout its entire length; the other, which forms the cross threads of the web, is studded throughout by minute globules or knobs, as it were, of the silk secretion, which give it an adhesive character, and doubtless serve the purpose of more firmly binding together the structure of the web. It has been thought that these glutinous threads are spun by a special pair of spinnerets, but it appears to me that the difference in the two threads is caused solely by the first being spun from as much of the secretion as is emitted at one time, stretched to the fullest extent that its great elasticity will permit; and that the other is the result of successive supplies of the fluid, each successive emismission being marked by the formation of one of the knobs or globules.

The threads of spiders' silk are very fine, the simple ones being about the thousandth of an inch

in thickness, the glutinous ones rather more. It has been generally stated that each of these threads is composed of a number of minute filaments, depending upon the number of tubules in the mammulæ from which they were spun. I cannot help thinking, however, that such is not the case, and it certainly appears to me to be more natural and more in accordance with the facts, as I have observed them, to suppose that the secretion from the numerous tubules coalesces on the surface of the mammulæ to form a single drop of the viscus fluid, from which drop a homogeneous, and not a compound, thread is spun.

Fig. 124. Silk glands and tubules.

It seems to me, if the thread was so complex as has been supposed, that some observer would have succeeded in isolating the various filaments; but as far as I am aware this has never been done. Their existence, therefore, is certainly not proven, and is, I think, an unnecessary assumption.

A single web often contains more than three hundred longitudinal and as many transverse threads: so elaborate is the seemingly simple net a spider sets to catch its prey!

T. Graham Ponton, F.Z.S.

"PERLEY'S MEADOW" DEPOSIT.

The following forms of Diatoms have been detected in the deposit from Perley's Meadow, South Bridgton, Maine, which through the kindness of the Rev. E. C. Bolles, of Portland, has been sent to the Editor of this journal for distribution amongst its microscopical readers. It contains, as will be observed, some very interesting species.

Navicula rostellum (Smith); *Navicula apiculata* (Gregory). Valve elliptic oblong, apices produced, nipple-like, transverse striæ fine, reaching median line, curved striæ crossing in both directions towards the median line, coarser than the transverse (fig 125).

The arrangement of striæ seems peculiar to this species. I have never seen any other form of the naviculoid group showing this very peculiar striation; in some of the discord forms a similar striation may be detected. Dr. Lewis refers this form to *Navicula placenta* of Ehrenberg; I prefer retaining Professor Smith's specific name, as it is very doubtful whether Ehrenberg's form is really the above species, the markings being far beyond the resolving power of his instrument, and his outline would suit many other species.

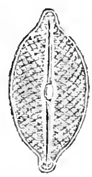


Fig. 125. *Navicula rostellum* × 600.

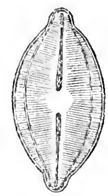


Fig. 126. *Navicula gastrum* × 400.

Navicula gastrum (Ehr. ?) Valve elliptic, apices slightly produced, median blank space small but distinct, striæ distinct, slightly radiant (fig. 126). I have followed Dr. Lewis in adopting Ehrenberg's specific name, but have much hesitation in doing so; it resembles *N. firma* in the median blank space and intra-marginal lines, but differs from that species in the slightly radiant striation.

Navicula Americana (Ehr.) Valve linear, ends rounded slightly, constricted towards the centre, median line and central nodule conspicuous, striæ distinct, about 40 in ·001, not reaching the median line (fig. 127, × 400). This form is very rare in the Perley's Meadow deposit, but is not uncommon in a deposit from West Point, New York, in which it occurs mixed with *Navicula Bacillum*, a species it much resembles; it may possibly be only a sporangial form of it. Ehrenberg's figure in the Microgeologic is very good, and leaves no doubt of the identity of the Perley's Meadow form and the species he figures.

Navicula scutelloides (?). Valve minute nearly orbicular, median line more or less excentric, central nodule conspicuous, striæ faint, about 50 in ·001 (fig. 128). I refer this species to *Navicula scutelloides* with much hesitation, but think it better to do so until specimens from other localities enable us to decide whether it is an effete state of *Navicula scutelloides* or a new species. It is not uncommon in the lightest portions of the deposit.

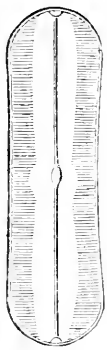
Navicula cocconeiformis (Gregory) =? *N. Carassius* (Ehr.) Valve elliptical, apices slightly produced, striæ obscure, median line and central nodule distinct (fig. 129, × 400).

Pinnularia cardinalis will be found in the heavy densities, and is generally very fine; the costæ are somewhat closer than those on the species found

in the Lough Mourne deposit, and at Hickling, Norfolk.

Pinnularia acuta (Smith). This species will be easily detected in the median densities.

Pinnularia viridis (Smith), a curiously distorted form, is not uncommon in this material, and affords a valuable illustration of the repetition of an accidental distortion by self-division; the distortion to which I allude is a sudden constriction of the valve on one side only.



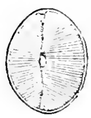


Fig. 128. *Navicula scutelloides* × 800.

Fig. 129. *Navicula cocconeiformis* × 400.

Fig. 127. *Navicula Americana* × 400.

Pinnularia isocephala (Ehr.) Valve linear, with three sub-equal inflations; ends somewhat deeply constricted and capitate, striæ distinct, radiant, not reaching median line, interrupted for some distance opposite the central nodule (fig. 130, × 400). This form has the undulations less distinct, and the ends more conspicuously capitate, than *Pinnularia nodosa*.

Stauroneis Baileyii, *S. Phœnicenteron*, *S. anceps*, and *S. gracilis* occur in this material.

Stauroneis (n. sp.) Valve minute, linear ends suddenly contracted and apiculate, stauros narrow, linear, not reaching the margin, striæ distinct, about 50 in ·001 (fig. 131). This curious little form is by no means rare in the lightest densities of this deposit.

Fig. 131. *Stauroneis* (n. s.) × 1000.

Fig. 130. *Pinnularia isocephala* × 400.

Surirella Craticula (Ehr.) This form occurs but rarely, and although a widely distributed species, has never been found in any quantity. It has been suggested by several observers that it is an abnormal state of some species of Navicula. Mr. Norman, in his "List of Diatomaceæ occurring in the Neighbourhood of Hull," published 1865, says: "This is certainly wrongly referred to Surirella; it has a distinct central nodule, and hence it must be removed to Navicula; and in all probability is a state of *N. cuspidata*." In a gathering from New Zealand it occurs with the outline of *Navicula ambigua*.

Surirella elegans (Ehr.) Valve oval and elliptical, alæ distinct, canaliculi delicate, 5 to 6 in ·001′, becoming indistinct as they approach the centre. This species was only known to Ehrenberg by the fragment figured by him. The author of the Synopsis seems to have overlooked or confounded it with *Surirella nobilis*. It occurs in several foreign

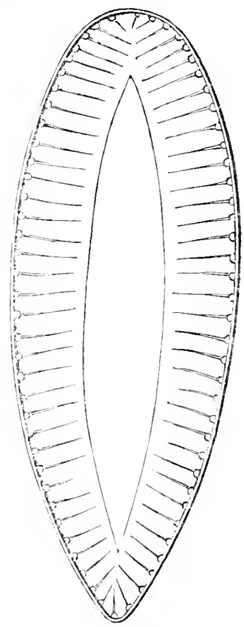


Fig. 132. *Surirella elegans* × 400.

and British deposits, and in recent gatherings from Scotter Common, Market Weighton Canal, Hull, and Devizes; in my slide from the last-mentioned locality it is very plentiful and fine; in the Perley's Meadow deposit it occurs but sparingly, and differs slightly from the species found in the above-named localities. The canaliculi are somewhat closer, and reach a narrow, well-defined, lanceolate blank space (fig. 132, × 400).*

Surirella cardinalis (n. sp.—F. Kitton). Valve broadly ovate, alæ distinct, canaliculi marginal, absent from the top of the valve 6 to 7 in ·001, central portion of valve faintly granulate (fig. 133, × 400). It is not without some misgivings that I make the above a new species; it may possibly be only a variety of *S. elegans*, but the short canaliculi

* The lanceolate space is too distinct in the figure.

and the abrupt bend on the top of valve (producing the appearance of a hinge connecting the two valves) would seem to indicate an amount of structural difference sufficient to warrant its separation from that species.

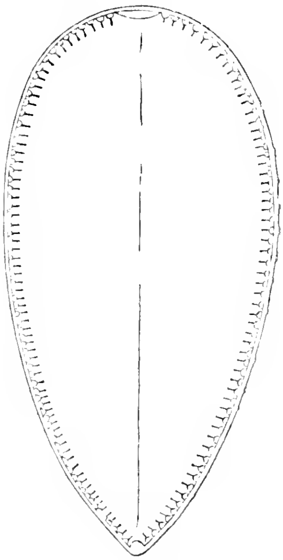


Fig. 133. *Surirella cardinalis* × 400.

Nitzschia sigmoidea, var. β (Smith) = *N. spectabilis* (Ehr.) Frustule linear sigmoid. Valve reflexed, apices suddenly attenuated, keel with a single row of puncta, striæ distinct, 36 to 42 in ·001 (fig. 134). This form is of frequent occurrence in the American sub-peat deposits; it may also be found in the Dolgelly, Cwm, Bechan, and Lough Mourne deposits.

Odontidium Tabellaria (Smith). Filament fragile, valve oval, acuminate or lanceolate, costæ interrupted, delicate, 36 in ·001.

Odontidium anomalum (Smith). Valve linear, suddenly constricted near the rounded extremities, costæ distinct (fig. 135). Scarce in the lighter densities.

Dimeregramma Harrisonii (Ralfs) = *Odontidium Harrisonii* (Smith). Filament short, consisting of not more than three or four frustules, valve cruciform, costæ moniliform, not reaching the centre of valve, 13 in ·001 (fig 136).

Fragillaria undata (Smith). "Filaments imperfectly tenacious, frustules frequently cohering by their angles, valve oval, acuminate, striæ 42 in ·001; var. β, valve linear acuminate; var. γ, constricted in the centre" (fig 137). The above are Professor Smith's specific characters of this species. It greatly resembles, if it is not identical with, Dr. Lewis's sporangial forms of *Odontidium Tabellaria*, figured in vol. iii., p. 180, of Science-Gossip.

Cyclotella minutula (Kutzing) = *C. operculata* (Smith). Valve with two series of striæ, apparently overlying each other; the upper are short, close, and marginal; the under conspicuous, and reaching the central portion of the disc: centre of disc obscurely granulate, common in this deposit.

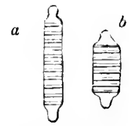


Fig. 135. *Odontidium anomalum* × 400.

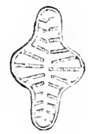


Fig. 136. *Dimeregramma Harrisonii* × 400.

Fig. 137*a*.

Fig. 137*b*.

Fig. 137*c*. *Fragillaria undata* × 400.

Fig. 134. *Nitzschia sigmoidea*, var. β, × 400.

This deposit is one of the most interesting of the Maine deposits. It is rather more difficult to clean than that from Monmouth, but will repay the preparer for the trouble bestowed upon it; and the readers of Science-Gossip who may have been so fortunate as to obtain any of it are greatly indebted to the Rev. E. C. Bolles for his kindness in forwarding it for distribution. Fred. Kitton.

Norwich.

Plague of Locusts.—At the present time, Italy is suffering under a plague of locusts, which the Government of that country is voting large sums of money to exterminate. We wonder whether "sparrow clubs" are fostered?

PEBBLE FINDING.

He fears no bailiff's wrath, no baron's blame,—
His is untaxed and undisputed game.

Crabbe.

THE above, though referring to the entomological pursuits of the old Spitalfields weavers, may with propriety be said of the pebble-hunter; and as I do not remember seeing in these pages any gossip upon seaside pebbles, I am induced to pen a few lines with the view of drawing the attention of any who may be "going to the sea" to a source of very pleasant recreation, and, indeed, of instruction. Like many other collected objects, too, the specimens, when polished and put away, serve to remind one afterwards of many a delightful seaside trip, and many a pleasant stroll with, maybe, a pleasant friend along the shore, as well as bear at all times fresh and fresh inspection, and each time, probably, display some new beauty which had not been observed before.

Summer will probably suit most people better for pebble-hunting than winter, for it *is* cold standing about sometimes; nevertheless, after a heavy winter's gale, when the beach has been well "turned over" by the waves, *that* is undoubtedly *the* time to stroll along the shore. There are the objects of your search on every side—yours, absolutely yours, to reject or carry away; and your sense of independence and freedom from interference makes the pebble-hunter's pursuit a very pleasant one. Notwithstanding what Crabbe says of the insect-hunter, he may, by imprudent intrusion into a tempting cover, find himself face to face with an irate bailiff, whose love for pheasants may be great, and whose contempt for entomology, except in the case of ant eggs, may be still greater. But on the beach the pebble-hunter is "monarch of all he surveys." He has but to use his eyes, or, when doubtful, his hammer, and the hidden beauties are his own. And *what* beauties do those rough-looking stones hide! What rare combinations of colour are to be found within them—sometimes pervading the entire pebble, sometimes looking like delicate moss floating in a calm pool of chalcedony! What pretty landscapes in miniature, the distance lit up by gorgeous sunset hues! How beautiful are the ramifications of the sponges, how wonderful the radiations of the choanite!—the last seeming as though it had died and been turned to stone but yesterday, instead of having been the inmate of its flinty bed for we know not how many thousand years. We can't help it, but we seldom bring to the light of day a recondite tenant of a pebble without a sense of great intrusion. It seems as though one had no business to break in upon the mysterious repose of such a venerable organism.

But perhaps our reader is saying, "All this is very well; I never had the chance of indulging in this sentimentality, for I never could find a pebble in my life. They look very pretty in the bazaars and lapidaries' windows, and very dear they are too. All I ever got for my trouble, if I summoned courage to take a stone to a lapidary, was, 'Sorry to say, sir, your pebble is only flint. I don't believe they are found on our coasts at all.'"

True it is that *all* that are exposed as local pebbles are *not* local pebbles; but, speaking from eight years' experience (on and off) of the south coast beaches, I can assure such incredulous, because unsuccessful, grumblers that beautiful pebbles are to be found on our coast (I refer now to Worthing, and right and left of it for miles); and I can also announce to all whom it may concern that a very honest and clever lapidary resides in that same place, and that Mr. Dowsett will never play false with anybody.

And now come with me in imagination, good reader, to our Sussex beach, and I will give you a short lesson on "indications."

Here is a nice bit of beach where the pebbles are not too crowded. We are just in time, too, for the tide is just leaving the beach, and the pebbles are wet. Look at this pebble I have just picked up. Rough looking I grant you; but I turn it over, and now what see you? "Some blue-looking bubbles in a depression of the stone?" True! that is chalcedony; and where there are well-developed bubbles of chalcedony, there is generally something good within. Now here is another. "No bubbles there?" No; but wait. Do you observe those marbled colours, red and black, mingling with each other, and looking transparent? and holding my hand slantingly over the top of the pebble against the sun, see! the whole of the upper part *is* quite transparent! That is a beautiful moss agate. But now here is a choanite. "You don't see any feelers?" No; and I don't like the feelers to appear too plain on the outside. But mark, there is a sort of depression in the stone, and in its centre a granular-looking circle; that is the root. Having plenty at home, I'll break it. There! see how the feelers spread with beautiful regularity all through the pebble, but all starting from that base which I called the root, the whole looking like an anemone of our modern aquariums. Here is a sponge. How do I tell? By that rough reticulated round button. And here is a pebble with a transparent round coloured patch on the surface; that is either a small choanite or a species of madrepore." With these precise indications, now go and try for yourself. But I will not close without a few general remarks. The patch above mentioned is seen very frequently upon long-shaped pebbles—*sausage-shaped* we may say; and the indication appears at both ends. These are often very pretty specimens when "split" lengthways, displaying

very delicate markings; at all events they are always worth a tentative tap with the hammer. Sponges, again, often present themselves on the shore in hemispherical shape, the flat side usually bearing plain indication of what lies within. A gentle tap with the hammer on the edge of the flat surface will soon decide the value, or otherwise, of a stone thus shaped. *White-coated* stones should not be despised; the outer envelope may be chalky, the inner may be flinty, but within may lie a very gem. A minutely speckled or dotted stone should always be attentively examined. With regard to agates, we may say generally that the finer—that is the larger—the "bubbles" of chalcedony, the finer is the pebble that contains them. And as a last hint I may add, "*Don't be too hasty with the hammer!*" But at the same time, if your doubts are so strong as to lead you to risk a fracture, and your hammer is left at home, take your suspected specimen home to the hammer, and *don't throw it down,* by which action you go beyond a fracture too often, and obtain only a long-repented *smash.*

Worthing. Rev. W. E. Hambrough.

KING OF THE RATS.

There is a remarkable disease which appears to be not uncommon among rats in Germany (but of which I never heard mention in either England or France), and there known as the "Ratten König," or "King of the Rats." I have before me two zoological works in the German language, by well-known naturalists, both quite recent—in fact one of them is not yet completed; and in each this singular disease, or whatever it is, takes its place among the phenomena of rat life. The accounts are so curious that I will transcribe them (promising only that the first is considerably condensed for brevity's sake), in the hope that this notice may elicit some information from readers of Science-Gossip.

A very peculiar disease sometimes attacks the rat in its wild state. The tails of several grow together, forming what is called a Ratten König—examples of which may be seen in various museums. At one time it was believed that the veritable king of all the rats, wearing a gold crown on his head, sat enthroned on one of these groups of combined tails, and from thence administered the affairs of the whole rat world!

Certain it is that occasionally numbers of rats are discovered with their tails closely united together; and as it is impossible for them to move about, they must of necessity be fed by others of their own species. The particular cause of this strange phenomenon has never been clearly ascertained. It is supposed that a viscid matter exudes from the tails, which binds them firmly together; but no one is in a position to say whether this is positively the case or not.

There is a Ratten König at Altenburg, consisting of no less than twenty-seven animals; others are to be seen at Bonn, near Schnepfenthal, at Frankfort, at Erfurt, and at Lindenau, near Leipsig. The genuineness of the last-named example was regularly certified before the proper authorities; and perhaps I shall be doing my readers a service in reproducing the documents. "On the 17th January, 1774, there appears at the Council Chamber, at Leipsig, Christian Kaiser, miller's assistant, of Lindenau, who states that early on the previous Wednesday he had captured and killed in the mill at Lindenau a Ratten König, consisting of sixteen rats; that on the aforesaid day he heard a noise behind a beam, which proved on inspection to proceed from several rats; that on procuring a ladder, and examining the spot with care, he, with the aid of an axe, managed to extract the above-mentioned King of Rats; that the mass was so firmly combined by their tails, that not one of them was separated from the rest when they fell from the beam to the ground; indeed, so closely where they all united, that the deponent does not think it would be possible to part them without using considerable force," &c.

Other attestations follow, confirming the above statement in every particular. The last document given is the evidence of a surgeon, who was commissioned by the magistrates to examine the Ratten König. He states that he found the animals laid on a table, with their heads forming the circumference of a circle, in the centre of which were the tails, so united and involved as to form a large knot—the centre itself having the appearance of a piece of rope with the ends unravelled. The union in many of the tails extended to within an inch or two of their base. After giving the matter a careful examination, he says, "I am of opinion that these sixteen rats, differing in size, colour, and age, had collected in the hole where they were found for the sake of warmth, for the weather during the week preceding their discovery had been singularly cold." In conclusion, he asks, "Is it impossible that the moisture exuding from these animals, combined with their natural secretions, might, through the agency of the prevailing frost, glue their tails together to such an extent as to prevent them from separating again?"

It is not unlikely that these curious phenomena are of more frequent occurrence than is generally supposed, for in most parts of the country superstition still forms so strong an element in the popular character, that a Ratten König is no sooner discovered than it is destroyed.

Lenz, the accurate observer of facts connected with natural history, vouches for the truth of the following tale:—

"In December of the year 1822, two Ratten

König were captured at the same time at Döllstedt, a village lying about eight miles from Gotha. Three men, while engaged in threshing, were led by a squeaking which they heard to examine a joist in a shed near to the spot where they were working. A quantity of straw was piled up from the floor to the roof; removing this, they could see in a large hole in the joist a number of rats (forty-two as it afterwards appeared), all of which were in due time dragged out; but what was the men's astonishment to find that no less than twenty-eight of these rats were united together by their tails—their heads when the bodies were extended forming a complete circle; and that the remaining fourteen were also, in like manner, bound into one mass. The animals were all about the same size, with clean glossy coats; but were evidently half famished. The two monsters were carried into their employer's house, where they caused no little excitement among the villagers. As soon, however, as the curiosity of the people was satisfied, the unfortunate rats were all put to death; but it was only by swinging them about for some time that they were able to separate two or three of the bodies from the general mass. The tails of those thus separated showed clearly the impression made by contact with their neighbours."—*Brehm. Illustrirtes Thierleben*, vol. ii., p. 125.

The other authority to whom I alluded is Lennis, the author of "Das Thierreich." Under the head of *Mus decumanus* (Brown Rat) he writes: "The viscid tails of young rats, when enclosed in a very narrow space, are sometimes found to have grown together, and such a combination is commonly called a Ratten König. This curious circumstance occurs equally among individuals of the next species, *M. rattus*, or Black Rat. In the Natural History Museum at Altenburg there is preserved a Ratten König formed by the union of twenty-three animals."

I will only ask, in conclusion, Are there any similar cases on record in England?

Clifton. W. W. SPICER.

MAPLE BLIGHT

(*Uncinula bicornis*).

DURING the autumnal months, the leaves of the Maple and Sycamore are liable to become infested with a kind of blight, which gives the leaves a whitened appearance, as though they were covered with finely-powdered chalk. This appearance may be overlooked when the plants are growing beside a chalky road in dry weather, for then all leaves look whitened alike; but when examined by means of a pocket lens, a number of minute black dots are seen scattered over the white stratum. These are the receptacles which contain the fruit of the "blight" or fungus. If a fragment be submitted to the microscope, under an inch objective, the little black dots will assume a most elegant appearance. Each dot is a little sphere, flattened at the poles, with a reticulated surface, attached at the base by branching root-like threads to the leaf, and surrounded by a fringe or circlet of white radiating branchlets—divided once or twice—with their ultimate extremities curved or coiled in a circinate manner.* Thus much only will be observed of them *in situ*, save that when young their surface is yellowish, becoming browner and darker with age. If one of the receptacles is broken up and viewed with a higher power, it will be found to

Fig. 138. Maple Blight—Lower figs, end of appendages, and spores.

contain numerous pear-shaped bags (asci), each holding eight spores. This is the fruit of the blight, which is called *Uncinula* on account of its hooked appendages, and *bicornis* because the hooks or horns are double, or in pairs.

This kind of parasite is common both in Europe and America. With us, similar species are found on poplar and willow leaves, and others less like, as belonging to different genera, on guelder-rose, berberry, gooseberry, hop, crowfoot, pea, grass, and the leaves of various other plants. All of these deserve a greater popularity with microscopists than they have yet secured. Our American readers will find a large and beautiful species (*Uncinula polychæta*) on the leaves of *Celtis occidentalis*.

In the above figure one of the receptacles is given as seen under a half-inch objective, and beneath this three spores more highly magnified. On each side of the latter one of the tips, or outer extremities of the appendages.

* Mounted slides of this and other microscopic fungi may be obtained of Mr. C. Collins, Great Titchfield Street.

ZOOLOGY.

Ichneumon and Cobra.—It is so generally believed that the bite of the cobra is fatal to all animals except the *ichneumon*, or mungoose, which is believed to possess in its blood, or to have some capacity for discovering, an antidote to the poison, that we are glad to find some exact experiments on the point. Surgeon-Major C. R. Francis, writing in the *Indian Medical Gazette* for April, details the results of some very interesting inquiries recently conducted by him. These results show in the most conclusive manner that the ichneumon is not possessed of any special immunity from the effects of the cobra's poison, and that, since it dies almost immediately after it has been bitten, its supposed instinct for the discovery of an unknown (!) herb is equally a delusion. Surgeon-Major Francis, who had collected seven lively cobras for experimentation, thus describes the results: "Before commencing the experiment, the cobra was *tested*, a supply of fowls and small birds being retained for the purpose. In each case the tested bird died shortly after being bitten in the usual way. It faltered in its gait, limped, sank on the ground, became lethargic, and then fell into convulsions, in which it was carried off. Sufficient time was then allowed for a copious re-secretion of the poison, and the animal to be bitten was presented to the cobra. As a rule, the latter would not voluntarily bite its victim; and it became necessary to force the poison-fangs into some fleshy part of the latter. In the case of the mungoose the inner part of the thigh was selected. The operation was most successfully performed in each case by two snake-charmers. Three mungooses were operated upon, and *they all died*, at intervals varying from fifteen minutes to six hours each, in precisely the same way." A positive result of this kind is worth thousands of negative ones, since it really decides the question definitively. We may state that two other interesting facts have been arrived at by Surgeon-Major Francis: (1) that harmless snakes are just as liable to the poisonous effects of the cobra's bite as are other animals; and (2) that the cobra itself is the only creature which appears to be uninfluenced by the poison. This last would appear to be demonstrated by an experiment in which two cobras were made to mutually wound each other without any apparent result beyond temporary inconvenience.

How Musk-rats swim under the Ice.—Musk-rats have a curious method of travelling long distances under the ice. In their winter excursions to their feeding-grounds, which are frequently at great distances from their abodes, they take in breath at the start, and stay under water as long as they can. They can rise to the ice and breath out the air in their lungs, which remains in bubbles against the lower surface of the ice. They wait till this air recovers oxygen from the water and ice, and then take it again, and go till the operation has to be repeated. In this way they can travel almost any distance and live any length of time under the ice. The hunter sometimes takes advantage of this habit of the musk-rat in the following manner. When the marshes and ponds where the musk-rats abound are first frozen over, and the ice is thin and clear, on striking into their houses with his hatchet for the purpose of setting their traps, he frequently sees a whole family plunge into the water and swim away under the ice. Following one of them for some distance, he sees him come up to renew his breath in the manner above described. After the animal has breathed against the ice, and before he has time to take his bubble in again, the hunter strikes with his hatchet directly over him, and drives him away from his breath. In this case he drowns in swimming a few rods, and the hunter, cutting a hole in the ice, takes him out. Mink, otter, and beaver travel under the ice in the same way, and hunters have frequently told me of taking otter in the manner I have described when these animals visit the houses of the musk-rat for prey.—*San Francisco Scientific Press*, Jan. 25.

Varieties of Butterflies.—In looking through the back numbers of Science-Gossip, I observe that in the number for October, 1867, a correspondent makes inquiries about varieties of *C. Edusa* and *A. Paphia*. When he says *legs* of Edusa, does he not mean *wings*? I have taken such a variety on several occasions, but in each case they were males; I have never yet noticed it in the opposite sex. The so-called "black variety" (Valezina) of Paphia I have seen on several occasions in the New Forest, and taken it once or twice. One season I knew of seven or eight specimens having been taken by different entomologists. Unlike Edusa, the variation in this species is entirely restricted to the *females*. One specimen I have has a "lighter patch" on each fore-wing, as described, but another is so entirely dark that the spots are almost hidden. Speaking of varieties of butterflies, I may mention that the variety of the Ringlet (*S. Hyperanthus*) which is destitute of the markings from which it takes its common name, is often to be met with in the forest, also varieties of *A. Galathea* with the *under* side of the hind wings of a brown colour.—*G. B. C., Ringwood.*

Venom of Toads (p. 114).—Is the toad so poisonous as we are led to infer from a paragraph borrowed from the *British Med. Journal*? The names of three French chemists are there given in evidence of the fact—if fact it be—that "smaller

animals coming under the influence of the venom undergo true narcotic poisoning, soon followed by convulsions and death." Now it is a most remarkable circumstance that the experiments made by English chemists differ *toto cœlo* from this sweeping observation—in fact, they run in an exactly opposite direction. The names of Davey and Raines command at least as much respect as those of Gratiolet and Cloez; and their testimony goes to show that the toad's secretion (though bitter to the taste, and very acrid—even to the extent of causing a smarting sensation when applied to the hand) is nevertheless perfectly innocent of any death-dealing properties. Dr. Davey tried it on a chicken without any injurious effect. Raines went more deeply into the matter. Having soaked pieces of thread in the secretion, he passed them through the ears of mice and kittens, without causing either animal the slightest inconvenience. Mr. Raines adds the valuable remark that "analogy is in favour of the comparative harmlessness of the toad's secretion. It is diffused over a large part of the surface of its body; whereas in all animals provided with a specific venom, and not a mere irritant, the apparatus which produces and supplies it occupies, as is well known, a very confined locality." (The above, with a great deal more information of a similar kind, is to be found in the Transactions of the Microscopical Society. I have not them by me at the moment, and cannot name the volume.) As to the supposed effect of the venom on the mouths of dogs which attack toads, I cannot help thinking that it is greatly exaggerated. That the fresh matter is acrid and unpleasant is certain, and no doubt it was given as a direct means of defence to the much-persecuted animal; but I can hardly believe that "on examination it is found that the palate and tongue are swollen, and a viscous mucus is exuded." Nor does the circumstance of "some savages in South America using the acid fluid of the cutaneous glands of the toad, instead of the curara"—(is it certain, by the way, that they do?)—carry much weight with it. We all know that many reptiles are poisonous: the question is whether the English toad is so. However, as an ounce of fact is worth whole reams of paper argument, perhaps some correspondent may be able to produce instances of positive poisoning by contact with the living toad; for the subject, though not one of deep importance, is still of considerable interest to lovers of natural history.—*W. W. Spicer, Clifton.*

Ants at the Crystal Palace.—A most interesting addition to the attractions of the Crystal Palace has just been made by an ant's nest, found within the last few weeks by Mr. Robert Holt, under the floor of his house at Lower Norwood. Mr. Holt, who is the lessee of the French Court in the Crystal Palace, has taken care to preserve this nest in its integrity as found, and it is now placed on a marble pedestal in front of the French Court, where it attracts great attention. The nest, which appears to have been formed of masticated wood, is about twelve inches square, and is full of perforations, as the nests of other insects; and the ants who have created it may be seen swarming in and out of the nest, and up and down the pedestal with their proverbial activity. The base of the column is immersed in a shallow tank of water, which effectually prevents the escape of the insects from the nest and column to which they are confined. Food for the thousands of ants now occupying this nest is of course provided. Within the last few days they have reduced the carcase of a sparrow to a skeleton, and nothing can be more interesting than to witness the avidity with which a lump of moistened sugar is sucked so dry by the thirsty insects that they are at last fain to carry off the solid remains, as a provision for the future, to the inmost recesses of the nest. Under the genial warmth of the Crystal Palace, the ants, thus carefully tended, set a daily example of activity and providence, and are likely to prove a permanent attraction.—*The Standard*, May 13th.

What's in a Name?—A querist, at p. 119, desires the etymology of Poll, as applied to the parrot. This bird, called ψιττάκος by Plutarch, was known to the ancients after the Eastern conquests achieved by Alexander the Great; this name, I fancy, means the "chatterer," from ψιθυρος, to chatter. With us moderns, the name of parrot is a term of endearment, from Pierre, *Peter*, hence Pierrot, Perroquet. Premising this, I may remark that there are three plausible explanations of the word Poll, or Polly:—1, it may mean the well-known diminutive of Mary, as applied to the *female* bird. 2, it may refer to the poll, or *head* of this bird, which in some species is distinguished by a prominent crest, or *cockade*, hence cockatoo: domesticated birds continually protrude this part, to solicit the well-known salutation called "Scratch a poll, Polly!" 3, which I incline to myself, viz., Poll for Paul, which, like Pierrot for Peter, is of apostolic celebrity. Paul, or Paulus, is the diminutive of *Pauxillus*, "very little;" I should fancy it might very well be a pet name for this favourite bird; and coming to us from the French, would receive their pronunciation of *Pól.*—*A. H.*

Fan-tailed Carp.—I have a very peculiar Golden Carp, which I purchased of a man who hawked them about; it is about four inches long, and has a very peculiar tail, or more proper two tails, which instead of being perpendicular, are horizontal. The man had another like it, and called them fan-tails.—*T. R. Clephan.*

BOTANY.

LASTREA RIGIDA.—As I believe it to be the general, if not the universal, belief that the fern *Lastrea rigida* grows truly wild in this country only in Yorkshire, Lancashire, and Westmoreland, I have the pleasure to send you a plant from North Wales, which district, I think, is now entitled to be added to those above mentioned. During the autumn of last year I met with this fern on the ridge of mountain limestone which occurs to the north of Llangollen. The area occupied by the fern, so far as my observation has gone, is very limited, being comprised perhaps within a circle having a radius of fifty yards; it is, however, very plentiful within this boundary. Some of the plants have extended themselves very much, the unfurled fronds in many cases covering a space of two or three square feet. Soon after I first found the fern (about the identity of which I had some doubt) I had an opportunity of visiting Arnside Kudt (near Silverdale, Westmoreland), a recorded habitat of *rigida*, and was pleased to find that the plants growing on that hill coincided perfectly, both in habit and structure, as well as in the peculiar and decided odour which they emitted, with those brought from Llangollen. The outline of the fronds is, with scarcely an exception, elongate-triangular, the lowest pair of pinnæ being longer than—or at least as long as—any of those above them. The specimen sent you differs from the normal form in as great a degree as any I have noticed, the stipes being comparatively shorter than usual, and *several* of the lowermost pinnæ being of about equal length. I may state that the other limestone fern, *Polypodium calcareum*, grows in company with the *Lastrea rigida* at the Llangollen station.—*George R. Jebb, Chester.*

THE MELON.—The history of the melon, and its varieties, is one of the most obscure in botany, for we neither know the origin of the species nor the true cause of the appearance of the many well-marked races, such as the green-fleshed, white-fleshed, netted, cantaloupes, &c., into which it has diverged. As M. Alphonse de Candolle has clearly shown, there is no good reason to suppose that the Romans were acquainted with it, although it has been thought to be the "melo" of Pliny, which, however, was a sort of cucumber. What is very remarkable is, it appears that the more we approach the southern parts of Asia the more modern does the cultivation of the melon appear to be. It is true that Wildenow says that it is wild in the country of the Kalmucks, but without producing his authority. De Steven, a Russian botanist, also relates that he found it far from houses in a barren place on the banks of the Kour, a river of Schirvan. Another German traveller, Hohenacher, also speaks of it as growing near Elizabethpol. But all these cases are apocryphal—that is to say, there is nothing to show that the plants found by those travellers were really wild, if indeed they really were melons. The question, then, may be naturally asked, How are we to determine their origin? Under these circumstances it would seem that the most probable method of doing so is by cultivating all the varieties that are procurable, marking their variations, observing all tendency to lose the customary characters, and continuing to trace degeneracy till it reaches at length either the point of original departure from some other fruit, or settles down in an unalterable original form.—*George Newlyn.*

VARIETIES OF THE WOOD VIOLET (*Viola sylvatica*, Fr.)—In SCIENCE-GOSSIP for 1866 (p. 163), I drew attention to a white-flowered variety of this violet which had been found near Wycombe. I then remarked that, had the form known as *V. Reichenbachiana* been ascertained to grow in our district, I should have been inclined to refer the specimens mentioned to that sub-species. Recent investigations have convinced me that I should have been quite correct in so doing, as I have now distinguished *V. Reichenbachiana* in two or three localities, one of which is the very lane from which the aforesaid specimens came. On the 25th of April last, however, a root of *V. Riviniana* was found near here by Mr. T. Marshall, on which were four large white blossoms, most beautifully veined with purple; and close to this another variety with pink flowers. Another white-flowered specimen was found in a different place a few days later; and a plant with a perfectly double blossom of the usual colour was brought me about the same time.—*B.*

BOUGAINVILLEA SPECTABILIS.—This is one of the handsomest climbers in the world when it will condescend to blossom. It has been in flower for the last two years at Lady Dorothy Nevill's, at Dangstein; and although the plant is some few years old, this is the first time of its blooming. It is grown in a span-roofed pit, which is treated like a stove, and the climber is trained along a trellis immediately under the south side of the roof, at from nine to twelve inches from the glass. For a long time it continued to grow rapidly, throwing out strong sideshoots, and was frequently potted, but did not show any signs of flowering. At last an experiment was suggested by Mr. Vair, the very able and experienced gardener there, which ultimately proved a perfect success, and twelve months ago this beautiful plant was literally covered with bloom. The flowers were produced on the previous year's shoots. *Bougainvillea speciosa* is equally obstinate to flower, but in the gardens at Dangstein both have yielded to the treatment of their careful cultivator.—*George Newlyn.*

MICROSCOPY.

THE LEAD TREE.—A common amusement of boyhood is the pleasing experiment of the lead-tree. As a microscopic object, it may possibly be new to some of your readers. The apparatus which I have used for its exhibition is very simple. I take one of the square rings that are made for forming cells, break off one of the four sides, and cement a piece of thin glass on each side, to form a deep narrow cell,—in fact, it is a zoophyte trough; then cut a thin strip of zinc, and bend it so as to drop into the cell. Put as much acetate of lead, powdered, as will lie on the point of a penknife into the cell, and fill it up with water by means of a dipping tube. Insert the strip of zinc, and view it immediately with an inch or half-inch object-glass. As soon as the zinc is immersed in the lead solution, beautiful fern-like branches begin to open out from it on all sides. The object may be viewed by either transmitted or reflected light; the latter perhaps is the best. The theory of the action is thus stated in Fownes' Manual of Chemistry :—" When a piece of zinc is suspended in a solution of acetate of lead, the first effect is the decomposition of a portion of the latter, and the deposition of metallic lead upon the surface of the zinc; it is simply a displacement of the metal by a more oxidable one. The change does not, however, stop here. Metallic lead is still deposited in large and beautiful plates upon that first thrown down, until the solution becomes exhausted, or the zinc entirely disappears. The first portions of lead form with the zinc a voltaic arrangement of sufficient power to decompose the salt; under the peculiar circumstances in which the latter is placed, the metal is precipitated upon the negative portion—that is, the lead—while the oxygen and acid are taken up by the zinc." The effect may also be witnessed by putting a drop of the solution of lead upon a hollowed glass slip, and dropping in a few zinc filings.—*R. H. N. B.*

MYRIAPOD.—Sir John Lubbock has found a curious Myriapod, common in company with Springtails amongst old leaves &c., which has hitherto been overlooked. He calls it *Pauropus Huxleyi;* and another species, less common, he names *Pauropus pedunculatus.* The first of these is only $\frac{1}{24}$ of an inch in length, and is therefore quite a microscopic object.

BRITISH AND FOREIGN GALLS.—The lamented death of Mr. W. Armistead, who was pursuing this study in the prospect of publishing a work on the subject, is in some measure compensated by bringing another worker into the field. Any correspondent willing to assist with specimens are requested to communicate with Mr. Albert Müller, 2 Camden Villas, Penge.

NOTES AND QUERIES.

" THERE is a God," all nature cries;
A thousand tongues proclaim
His arm almighty, mind all-wise,
And bid each voice in chorus rise
To magnify His name.

Thy name, great nature's Sire divine,
Assiduous we adore;
Rejecting godheads at whose shrine
Benighted nations blood and wine
In vain libations pour.

Yon countless worlds in boundless space
Myriads of miles each hour
Their mighty orbs as curious trace,
As the blue circle studs the face
Of that enamelled flower.

But Thou, too, madest that floweret gay
To glitter in the dawn:
The Hand that fixed the lamp of day,
The blazing comet launched away,
Painted the velvet lawn.

" As falls a sparrow to the ground
Obedient to Thy will,"
By the same law those globes wheel round,
Each drawing each, yet all still found
In one eternal system bound
One order to fulfil.

BY THE LATE LORD BROUGHAM.

CLAYTONIA PERFOLIATA (p. 115).—I am not aware how long this plant has been introduced into England, but I can bear testimony to the fact of its having "escaped" as long as five-and-twenty years ago, the late Mr. W. Borrer having pointed it out to me in the year 1843 on Henfield Common, where it was growing in an apparently wild condition near a small stream. I think, but am not quite certain, that Mr. Borrer spoke of it as having been there many years. In the new edition of "English Botany" it is mentioned as being thoroughly naturalized in many places in England—Henfield, Sussex, &c.—*W. W. Spicer, Clifton.*

CLAYTONIA PERFOLIATA grows in large quantities in a wood in Chatsworth Park. This plant is not mentioned in "Sowerby" (2nd edition), but it will be found in "Baxter," and in "Sowerby" (3rd edition).—*F. R. W.*

SPRINGTAILS.—In the last part of the Transactions of the Linnean Society Sir John Lubbock contributes a third paper on the Thysanura, in which is included descriptions of seventeen species of British Podura, and allied genera.

ROSE WEEVIL (W. H. P.)—Your weevil from roses is *Otiorhynchus picipes*, Fab., abundant on all kinds of trees and plants, in cultivated and waste grounds, and which has been named *vastator* by an old English entomologist, from its destructive habits. Its larva is very injurious to roots in the autumn; and as a perfect insect it feeds on young shoots *by night*, when it should be picked by hand. Various remedies have been suggested, but the late Mr. Curtis, who gave much attention to injurious insects, relied most on hand-picking; he has remarked that crops in nurseries have been preserved by men going out at night and drawing the branches through their hands, putting the beetles into wide-mouthed bottles, or shaking the branches over sieves, which were emptied into boiling water. The weevils are so wary that no lantern must be used. With your rose-trees it would be easy, however, to put a large sieve or insect net beneath the infested branches, and use a dark lantern; for the beetle would fall into the sieve or net, if it escaped the fingers. Swallows often consume this beetle, catching it in their hawking flight along hedges, especially of hawthorn. Various numbers of the *Gardener's Magazine* contain notices of and suggested remedies for this pest. I find no remark upon it in "Köllar's Treatise on Insects injurious to Trees," &c.—*E. C. R.*

"SCARLET ROSE."—Your correspondent D. J., Clydach, Swansea, evidently wishes to elicit some information as to the question of J. R., Cae Wern, in the *Gardener's Chronicle* of March 14th, p. 268. He there states: "A gentleman who professes to have studied only the 'Book of Nature,' informs me that a scarlet rose cannot be produced, because there are no yellows in the class. He contends that what are called Yellow Roses are *not* really yellow, but have all a '*white ground*,' and *consequently* the Scarlet Rose *cannot* be produced." Now the gentleman evidently means to contend that a scarlet colour cannot be produced because the ground colour is white. If he will once more refer to the great "Book of Nature," and examine the petals of a scarlet bedding geranium, after carefully removing the thin cuticle (which is coloured) he will find the underlying cellular tissue to be of a white colour. This fact certainly and fully demonstrates that a *pure* scarlet colour can be produced upon a white ground colour; and furthermore, it shows that for the production of a scarlet colour a yellow ground is *not* absolutely necessary.—*F. W. Burbidge, Chiswick.*

LABURNUM (F. B.)—Your laburnum is the very curious *Cytisus Adami* concerning which so much discussion has taken place in the horticultural world. Various explanations have been given to account for the production of yellow and pink flowers on the same tree, such as hybridisation and reversion to parent forms, primary adhesion of two cells or parts of cells belonging to different plants, &c. The statement of the original observer, M. Adam, was that it was the result of a graft, effected by himself, of *Cytisus purpureus* on *C. Laburnum*, but this opinion has been discredited, as we think very unjustly, as M. Adam had no object whatever in telling an untruth; moreover, of late other instances have come to light in which an intermediate production, a "graft-hybrid," has been produced as the result of grafting. A summary of the most recent information respecting this plant will be found in the *Gardener's Chronicle*, 1866, pp. 850, 873, and 1217.—*M. T. M.*

ANOTHER TADPOLE OUT.—Seeing a paragraph headed "Tadpole out," in SCIENCE-GOSSIP for May 1868, page 119, I am induced to send you the following. Apparently the first duty or function performed by frogs after hybernation is to breed. For this purpose they take to the water, and in two or three days after leaving their dormitories the procreative process is begun. The early or late appearance of these Batrachians in spring depends on the mildness of the season; so also does early or late spawning, and the rapidity with which the eggs come to maturity. For the three springs just gone I have noted when I first saw a frog. In 1866 the first was on the 23rd of February. In 1867 I saw them in great numbers in a ditch-like pool on the 23rd of February, and surrounded with masses of spawn. I was informed by the farmer who resided close by that the frogs had been there as early as the 12th of February. This spring, 1868, I first saw them on the 25th of February, and on returning to the same pool on the 27th I got a supply of spawn. I was informed that they made their appearance on the 24th of February, in the pool where they were seen on the 12th the previous year. For this year I find I have noted: "March 11.—Circulation of blood in tadpole distinctly seen, and in one, a little further advanced, by transmitted light. Mouth formed March 12th." The tadpole which was so forward yesterday wriggled itself free of the egg to-night. This is three days earlier than that seen by F. O. M. I may add that my tadpole was house-bred, and therefore had the advantage of shelter. So much for tadpoles being early out. A greater wonder to me was seeing tadpoles the size these creatures are about the middle of May swimming actively about in a small loch as late as the 24th of October. Could these be from a late spawning, a second spawning, or a spawning in anticipation of the season to come, and before going into winter quarters? It is not likely that they had remained tadpoles from spring, from retarded development.—*J. M. A.*

THE STRUGGLE FOR EXISTENCE.—The other day I noticed a large number of black garden ants (*Formica nigra*) swarming over the flower-pots in a friend's greenhouse. Some plants of cineraria were literally covered by them. On examination I found that the branches of some vines in the greenhouse were spotted with "oidium," and to my surprise saw that each of the spots was the *prey* of two or three of the ants mentioned, a lot of others being busy running up and down the stems and leaves, and even the tendrils of the vines, as if in search of food. On turning to the cinerarias, I found that they were badly infested with the common green aphis, and that the ants were making short work of those garden and greenhouse pests. I have since gone into the greenhouse at intervals, and have found the ants at their refection as before. After nearly a fortnight's absence, I have to-day again visited the house, and find that the ants have quite forsaken the vines, and that not a single bit of blight is to be found upon them. The cinerarias, however, still appear to afford them food, although the quantity of blight on those plants seems to have materially decreased. In this case, at least, nature has obviated the necessity of the application of Gishurst's Compound.—*R. A., Wellington, Salop.*

REPTILES AND FISH REMAINS FROM THE COAL MEASURES.—In the May number of your excellent serial there is a short article on the above subject, on which, with your permission, I will make a few remarks. The chief object of the article seems to be the glorification of Mr. Atthey; and the means by which that object is sought to be accomplished is the depreciation—with an utter disregard for truth—of other collectors, some of whom have been much longer in the field, and have achieved much greater success. Mr. Atthey has now, says your correspondent, "the best private collection of *fossil* carboniferous fauna in the world." I have italicised the word fossil, in the hope that when the *cacoethes scribendi* again comes upon Mr. Barkas, *recent* carboniferous fauna may be suggested as a fitting subject for his facile pen. It does not appear to have occurred to Mr. Barkas that the coal measures of the world are not confined to Northumberland, and that there are many collectors besides those he has been pleased to enumerate in his article. In various parts of the country there are extensive collections of carboniferous fauna, in comparison with which Mr. Atthey's ought never to be mentioned at all. Such a collection is that of Mr. Ward, at Longton. For every fish in Mr. Atthey's cabinet there are upwards of a hundred in Mr. Ward's; and this is not a random statement, like that of your versatile correspondent, but one that is founded on knowledge. There are similar collections in the possession of Sir Philip Egerton, and others, of whose existence I presume Mr. Barkas has never heard. Professor Owen's description of new genera, which appears in the last volume of the Transactions of the Odontological Society, has also merited your correspondent's attention. It is stated that the twelve new genera "do not form the one-hundredth part of Mr. Atthey's vast collection." It must indeed be a vast collection if it contains twelve hundred *new* genera! Such a statement only shows that the writer's credulity is in inverse proportion to his knowledge. The specimens supplied to Professor Owen were carefully selected from amongst upwards of three thousand prepared sections, and the description embraces only a selection from the specimens sent. This will give some idea how "vast" Mr. Atthey's collection will require to be to answer Mr. Barkas's exaggerated description. No one knows better, or appreciates more highly than I do, the labours of Mr. Atthey; and from what I know of that gentleman I believe he will not feel complimented by the article in question. The papers referred to as having been written by Mr. Atthey are the production of Mr. Albany Hancock, Mr. Atthey having only supplied the specimens described. The suppression of Mr. Hancock's name is quite in keeping with the spirit of the article.—*T. Craggs, Gateshead.*

[We could not in justice refuse to insert the above, but at once declare our opposition to any discussion on the subject. It was manifestly unjustifiable to ignore Mr. Albany Hancock's part in the paper alluded to, and we cannot consent to be a party to the suppression of his name.—ED. S. G.]

PERCH IN AQUARIA.—Some time ago I read in one of the periodicals that perch in captivity were short-lived. I thought, perhaps, it might interest some of your readers to know that I have had one in my aquarium just five years. It is in a very healthy condition, and about eight inches long, and has become very tame. A few days ago it *spawned*. Is not that a very unusual occurrence?—*E. L.*

WATER BEETLE (*Gyrinus natator*).—I had one in a tumbler of water, into which I put for shelter for the beetle a few bits of paper. When disturbed, the insect, as is usual on ponds, dived to the bottom, and slowly rose under the paper until it touched it, with all the appearance of a dead insect, its legs hanging down precisely like those of a dead fly. So soon as the disturbing cause was removed, it drew up its legs and darted from its hiding-place. I tried it repeatedly, and it always acted in the same way.—*F. G.*

NOTHING NEW UNDER THE SUN.—Some months ago a question was proposed at the Quekett Microscopical Club as to what insect afforded the hairs sold as hairs from the larva of Dermestes. The following extract, whilst in some degree furnishing an answer, may perhaps throw some light on the origin of the question. "But the most remarkable larva for the shape of its hairs is that of the *Anthrenus musæorum*, the little pest of our cabinets which I noticed in a former letter. All the hairs of its body are rough, with minute points; but those of six diverging long tufts, or aigrettes, laid obliquely on the anal extremity of the body, which the animal, when alarmed, erects as a porcupine does its quills, are of a most singular structure. Every hair is composed of a series of little conical pieces, placed end to end, the point of which is directed towards the origin of each hair, which is terminated at the other extremity by a long and large conical mass, resembling somewhat the head of a pike." The extract is from Kirby & Spence's Entomology, vol. iii., pp. 177, 178.—*E. M.*

NEW PANORAMIC STEREOSCOPE.—The size of the picture in the ordinary refracting stereoscope has hitherto been limited to about three inches in each direction; consequently in a vast number of subjects, the effect has been to give a dwarfed, unnatural appearance. Bearing this in mind, the inventors have taken advantage of the fact that while the size of two pictures which can be united stereoscopically is limited in the horizontal direction because their centres must be as nearly as possible opposite the pupils of the eyes, in the vertical direction it is limited only by the angle of natural vision, which practically admits of the use of a picture nearly double the height of the width between the eyes. Thus pictures are taken in such a manner from, and of, great heights (of about 3 inches in width and 5½ inches in height) to be viewed stereoscopically, so that all objects are represented in better relative proportions. Both stereoscopes and pictures are produced at so moderate a price by Messrs. Murray & Heath, that it will be in the power of all to possess the really artistic and most entertaining scientific instrument known.

HEBONY.—Shakespeare speaks of a plant "Hebony," in that well-known passage in Hamlet,

> Sleeping within mine orchard,
> My custom always in the afternoon,
> Upon my secure hour thy uncle stole,
> With juice of cursed Hebony in a phial,
> And in the porches of mine ear did pour
> The leperous distilment.

Are any of the readers of SCIENCE-GOSSIP aware of any evidence that bears upon the subject? The commentators on Shakespeare suppose hebony to be henbane—an improbable suggestion, I think, when we consider how difficult it is to obtain juice from so dry a plant.—*George Newlyn.*

Gold Fish.—One of the gold fishes in my fresh-water aquarium has rather puzzled me lately by several of its fins and scales turning *black*. It has been in this state now for five or six months, and presents a most odd appearance, although in other respects it seems to be as well and lively as ever. I have searched in vain for any information upon the subject in my books, and want to know if any of the readers of your excellent periodical can tell me whether it is a *disease*, and, if so, what is its probable cause and best cure. I may add that the fish has been an inmate of my aquarium for the last seven years. I do not know whether Tettenhall has ever been named as a locality for the Dusky Cranesbill, *Geranium phæum*. I found this splendid plant in flower on the 1st of May, and as it is far removed from any garden, I do not think that it can possibly be an escape.—*E. Banks, Teltenhall, near Wolverhampton.*

Young Cuckoo.—In this month's Science-Gossip is an interesting account of a young cuckoo, by J. P.; but I must venture to disagree with the conclusion he draws, viz., that it was the foster-parents who ejected the two eggs and young ones. Apart from its being a gross violation of parental affection, is it not a more reasonable conclusion that the parent cuckoo herself ejected them? Several eminent naturalists affirm that the cuckoo's duty does not always cease with the laying of the egg, but that it hovers about the nest, and also ejects the foster-brood when its own egg is hatched, a feat generally attributed to the newly hatched cuckoo, but which, as in the present case, it is unable to do. *Apropos* of this subject, there are two excellent papers on the cuckoo in the March and April numbers of the *Zoologist*, worthy the perusal of every ornithologist, as they throw light on several obscure points in the life-history of this bird.—*F. G. Binnie.*

Prince Edward Island.—A friend writes from this colony: "I have not attended much to the objects of Science-Gossip for the last twenty-two years; yet perhaps a few thoughts have occurred to me which might suit. The extent and habitats of species (plants and birds) is a point on which much may be learned yet. We have *Geranium Robertianum* native here, as in England; *Linnæa borealis*, Lapland, with humming-birds from Barbadoes, hovering over it in summer-time. We have oyster-beds in our rivers fifteen and twenty feet deep, which we dig up wholesale, and find capital manure for wheat, grass, and clover; in fact it is our best and only mine. We have splendid butterflies of common sorts; and mosquitoes armed with bayonets!"—*S. S.*

Spiders in the Air.—In an interesting communication from Mr. F. T. Mott respecting the velocity with which small spiders sail from one place to another, as stated at a much greater speed than the current of air, is it not probable that the speed is regulated by the force of ejecting the thread from its body, the recoil propelling the spider in the opposite direction, the wind being its guide? —*J. B. Waters, Oakley Square.*

Query on Mounting.—Having repeatedly failed, with benzole, liquid ammonia, and liquor potassæ, to clean slides so effectually that an aqueous fluid *in small quantity* shall lie evenly upon them, I should be grateful to any correspondent who would tell me how I may succeed.—*J. B.*

Cowslips (C. D. H.)—In your cowslip, the calyx is completely divided into its five component sepals, or, to speak more accurately, the union of sepal to sepal, which ordinarily occurs in this plant, has not taken place, unless it be to a very slight extent at the extreme base. It is not a very common occurrence in this particular species.—*M. T. M.*

Greene's Insect Hunters. — I have been trying in vain for some time to get that very useful little book "Greene's Insect Hunter's Companion." It is unfortunately out of print. I shall be grateful to any of your readers who can put me in the way of getting a copy.—*F. M. N., Post-office, Box Hill, Hastings.*

Storm Glass.—At page 117 the component parts are described as—camphor, 272 drachms (or 34 ounces); nitre, 38 grains; sal ammoniac, 38 grains; water, 9 drachms; and spirits, 6 drachms. Will you inform me if the quantities are rightly given, as the quantity of liquids seem to me incapable of dissolving the solids.—*J. W. Worster.*

Fusus Berniciensis.—Some two years ago I had the good fortune to pick up, brought up from deep water on the fisherman's lines, a fine specimen of *Fusus Berniciensis*, of the identity of which there can be no mistake. Can any of your readers inform me if it has been found anywhere else on the coasts of Scotland. I am not aware of its having been so. I have very carefully watched ever since I knew that it was rare for other specimens, though I have never yet found any. It may be noted that the animal was inside the shell, though dead, as it had been out of the water for some time. There can therefore be no doubt that it properly belongs to the district.—*Thomas Bell, Peterhead.*

How to Destroy Ants.—If you can make it known how ants may be prevented from ascending trees and destroying fruit just as it is becoming fit to pluck, you will oblige me and many others. Keating's Insect Powder will not answer, as when the ground is not damp the wind disperses it. This powder is an excellent thing to use where it is dry, and there is no wind to blow it away. By using it according to printed directions I have succeeded in clearing my house, every room of which was infested with myriads of ants, after having tried many other means to endeavour to destroy or banish them.—*Melbourne Australasian.*

West London Field Club.—This club has just issued its card of excursions for the season, and we are requested to intimate that communications may be addressed to the Secretary, at 192, Piccadilly, of whom all information may be obtained relative to the club and its movements.

Schafer's Egg Tester.—This is an ingenious little instrument for testing the quality of eggs, so far as indicated by their transparency. It consists of a little cubical box divided diagonally by a mirror, and having one aperture above into which to put the egg, another in front through which the observer examines its transparency. If the egg gives a clear bright disc, it is good; if a black opaque one, it is bad; and of course there is an infinite number of *nuances* and gradations between these two extremes. Some people do not like eggs too fresh, and they may pick out such specimens as indicate by their cloudiness a certain degree of ripeness, short of being quite addled.

NOTICES TO CORRESPONDENTS.

H. W. R. (Seaham) may obtain Reichenbach's work, for which he inquires, of Mr. William Russel, 19, Broad Street, Aberdeen, post free, six shillings.

T. P. B.—Lists and Tables have always been, and still are, inadmissible to our pages.

J. C. H.—Dr. Gray's edition of "Turton's British Shells," published at 15s., may be had of Wheldon, Great Queen Street, for 6s. 6d.

F. W.—The moss is *Leskea (Homalothecium) sericea* with *Anomodon viticulosus* intermixed.—*R. B.*

R. A.—The rust on *Cerastium arvense* is *Uredo Caryophyllacearum*.

A. R. P.—Seeds may be obtained of Hooper & Co., Covent Garden Market.

M. G.—Half a dozen "Coil Shell" Snails (*Planorbis cornea*) will soon clear off the confervæ.

MITES (name of sender mislaid).—The Mites appear to be *Oribates fuscipes*, Koch. Deutsch. Crust., 38-9.—*I. O. W.*

W. W. S.—Apparently *Podura fimetaria*, so often found on garden walks.—*I. O. W.*

F. F. S.—The Lime Hawk Moth (*Smerinthus Tiliæ*).

L. V. H.—The green insects are Aphides or Plant-lice, the others are "Scale Insects" (*Cocci*). The latter are not very easy to get rid of at this time of year, when the very minute young are swarming.

F. W.—Not included in "Bryologia Britannica."

K. K.—It is *Chrysis ignita*.

A. B.—No. 1. *Fedia olitoria*. 2. *Ranunculus auricomus*.

E. S.—The only work we know of likely to suit you is Jenyns' "Manual of British Vertebrate Animals" (1835).

C. C.—A lady might presume to task Mr. Prince, but even for a lady's sake we dare not be so absurd. We have a strong opinion of our own, but are too gallant to let it out.

G. H. A. desires us to call the attention of our readers to an article in the *Quarterly Review* for April, entitled, "The Farmer's Friends and Foes."

J. C. D.—We cannot name such microscopic fragments.

PARSON BIRD.—The native name (in our last number) should have been TUI, or TOOE, and not TIN, as therein printed.

W. B.—The scale-like bodies on oranges are a species of Scale Insect (*Coccus*). See a paper by the late Mr. Richard Beck in the *Quarterly Journal of Microscopical Science*.

R. G. A.—Shells in fragments, and plant not recognizable. Box doubled up in transmission.

R. E. S.—See account of the *Octopus* in SCIENCE-GOSSIP for 1866, pp. 50, 87, 135. Victor Hugo has mixed together the characters of two different animals, it is said, in his description.

L. S. R.—The last Crane of which we have any record is one in Sussex in 1849. They are *very* rare visitors.

J. B. L.—A young and undeveloped condition.

E. G.—The malady appears to be caused by Thrips, an insect parasite to which Azaleas are very subject. Gishurst's Compound, made and sold by Price's Candle Co., is the approved remedy.—*M. T. M.*

F. G.—*Rhizomorpha*, an undeveloped condition of some Polyporus or other fungus.

J. W. G.—See SCIENCE-GOSSIP for 1867, pp. 142, 166.

G. B. (Preston).—Not fossils at all, but bad specimens of Carbonate of Lime in different forms, amorphous and crystallized.

E. G. S.—We can say nothing from description, but scarcely think them Ichneumons.

W. E.—Certainly Bentham's is the easiest and best English Botany for a beginner; beyond this there is a great difference between Bentham and Babington; and the experienced botanist considers *that* the best which accords with his own notion of the limitation of species.

J. S. W.—1. If we comprehend your question correctly, the reply is negative. 2. Double fruits are *not* unusual.

J. B.—Both specimens are *Orchis morio*, which is very variable in colour.—*W. G. S.*

F. W. B.—Our rule is not to answer more than two queries, or name more than two objects at a time. Can it be true that you do not know the Cockchafer (*Melolontha vulgaris*), the common *Dytiscus marginatis*, and the equally common Poplar Hawk Moth (*Smerinthus Populi*)?

R. A. surely cannot imagine that Latin descriptions of foreign plants is the sort of science-gossip that our readers require.

J. B.—1. *Uredo Potentillarum*. 2. *Puccinia Betonicæ*—too immature to be of use to any one.

W. H.—Although we do not believe in *Physa acuta* as a distinct species, your specimens agree well with what is called by that name.—*J. E. G.*

F. W.—The moss is *Orthotrichum diaphanum*.—*R. B.*

A. J. (Melrose).—No. 2. *Bryum pallens*. 3. *Hypnum (Plagiothecium) sylvaticum*. 1. and 4. Send further specimens. —*R. B.*

W. E.—*Jungermannia divaricata*.—*R. B.*

F. W. B.—No. 1. *Bryum inclinatum*. 2. *Hypnum rutabulum*. 3. *Dicranella heteromalla*. 4. *Pogonatum nanum*.—*R. B.*

EXCHANGES.

FORAMINIFEROUS SAND from Connemara, or Hair of Foreign Animals, in return for rare British Grasses.—J. C., 16, Ellesmere Place, Stockport Road, Manchester.

GLOIOSIPHONIA CAPILLARIS, and other Northern Algæ, for others from the Southern Coast.—T. Bell, 49, Queen Street, Peterhead.

FRESH SUGAR CANE in exchange for mounted objects.—J. H., Cheltenham Branch Dispensary.

MOUNTED CRYSTALS (several sorts), and Cuticles from Petals of various Plants, for named Eggs of British Lepidoptera.—E. M., 92, Southampton Row, W.C.

FORAMINIFERA (unmounted) West Coast of Ireland.—Send stamped envelope to John Waddington, 15, Peel Street, Rochdale, Lancashire.

REMAINS OF PLANTS found in Peat Bed, 25 feet below the surface. — Send stamped envelope, O. Poole, Uphill, Weston-super-Mare.

HAIRS OF SEA MOUSE, ORBITOLITES, and SPICULES OF GORGONIA, mounted or unmounted, DIATOMS and FORAMINIFERA, unmounted, for other objects.—W. W., 1, Mount Terrace, Westminster Road, London.

OAK BEAUTY (*Amphydasis prodromaria*), for any of the Clearwings, Emperor, or Kentish Glory.—J. Perdue, Ridgeway, Plympton, Devon.

PATHOLOGICAL SPECIMENS wanted for Pus and Cholestearin and Leucocythænic Blood (mounted).—Lawson Tait, Wakefield.

DIATOMACEOUS EARTH from Salem (Mass., U.S.), for good mounted or unmounted objects.—Lists to be sent to A. M. Edwards, 49, Jane Street, New York.

DAPHNIA PULEX, CYCLOPS QUADRICORNIS, or Larva of CORETHRA PLUMICORNIS, mounted, for good mounted medical objects.—Herbert M. Morgan, Lichfield.

SPICULES OF HOLOTHURIA, FORAMINIFERA, HAIR, and other objects offered in exchange for other objects.—T. D. Russell, 26, Westbourne Park Villas, W.

DIATOMACEOUS EARTH from Cherryfield, Maine, U.S., for good mounted objects.—E. C. B., care of the Editor.

AMERICAN UNIOS, LAND AND FRESH-WATER, or MARINE SHELLS, and POST-PLEIOCENE FOSSILS from Maine, U.S., for British objects of Natural History, Shells, Fossils, &c.—E. C. B., care of the Editor.

GORGONIA SUCCINEA, and other named species (mounted), for good Entomological or other slides.—W. Freeman, 2, Ravensbourne Hill, Greenwich.

MICRO-FUNGI, PUCCINIA BETONICÆ, and UREDO POTENTILLARUM, for other species, or good mounted objects.—J. Bowman, Cockan, Lamplugh, Cockermouth.

DIATOMS.—Twelve excellent slides will be given for a pure gathering of *Toxonidea* or *Pleurosigma formosum*.—J. A., 13, Suffolk Square, Cheltenham.

BOOKS RECEIVED.

"British Butterflies." A Broadsheet containing figures of all the British Butterflies at one View. London: Tweedie.

"Country Life." Nos. 38, 39, 40, 41. London: 10, Bolt Court.

"Proceedings of the Bristol Naturalists' Society" for April, 1868.

"The American Naturalist." Vol. II. Nos. 2 and 3, for April and May. London: Trübner & Co.

"The Naturalist's Circular" for May, 1868. London: H. Hall.

COMMUNICATIONS RECEIVED.—T. D. R.—W. H. L.—W. F. H.—E. M.—W. E. P.—J. C. H.—R. H. M.—J. S.—B. G.—A. S.—F. R. R.—T. B.—R. T. A.—F. W. C.—W. W.—F. S.—E. W.—G. E. Q.—T. S.—W. W. S.—G. N.—H. R.—E. D. R.—M. G.—A. R. P.—R. A.—J. H. C.—R. B.—J. C. H.—F. W.—J. G.—L. G. M.—T. P. B.—J. A.—E. B.—J. C.—H. G. G.—A. A.—W. F. H.—S. S.—W. R.—R. B. S.—B.—C. D. H.—J. C.—J. H.—G. G.—J. W. G.—H. W.—R. V. T.—F. M. N.—J. H.—F. G. B.—L. S. R.—J. B.—B. J. A.—F. R. B.—G. B. C.—R. H.—J. M. A.—G. C.—G. H. A.—G. S.—C. C.—E. S.—A. B. F.—O. P.—J. B.—K. K.—A. I.—R. A.—M. T. M.—C. O. G. N.—S. C. S.—F. W.—L. V. H.—T. P. B.—C. F. W.—J. W.—F. F. S.—B. M. W.—E. M.—E. W. V.—W. H.—J. C. D.—F. W. B.—J. T.—R. E. S.—G. B.—R. G. A. C.—W. B.—G. R. J.—A. B.—J. P.—R. G. A.—R. H.—W. W.—R. H. N. B.—J. S. W.—W. F.—T. R. C.—E. G. S.—J. R.—H. G.—T. D.—C. F.—F. W. B.—J. P. B.—J. B.—R. A.—J. A.—J. E. M.—S. C. S.

SENSORIAL VISION.

THERE is a chapter in Sir John Herschel's lately-published volume of "Lectures on Scientific Subjects," which treats of certain peculiar forms of ocular spectra, under the above title.

The spectra here alluded to—those which present themselves to us independently of the will in darkness or when the eyes are closed—are familiar to us all; but it appears to me that the subject has certain bearings which have been hitherto overlooked, and which merit a passing notice.

In the first place, I must beg permission to quote Sir John's own words respecting the most frequently occurring forms—those possessing perfect geometrical regularity:—

"I find them," he says, "to be formed in darkness, and if the darkness be complete, equally with open or closed eyes.

"The forms are *not* modified by slight pressure on the retina, but their degree of visibility is much and capriciously varied by that cause. They are very frequent; in the majority of instances, the pattern presented is that of lattice-work, the longer axis of the rhombs being vertical. Sometimes, however, the larger axes are horizontal. The lines are sometimes dark on a light ground, and sometimes the reverse. Occasionally at their intersection appears a small close and apparently complete piece of pattern-work, but always too indistinct to be clearly made out.

"Occasionally the latticed pattern is replaced by a rectangular one, and within the rectangles occurs in some cases a filling-up of a smaller lattice-pattern or of a lozenge of filigree-work, of which it is impossible to seize the precise form, but which is evidently the same in all the rectangles.

"Occasionally too, but much more rarely, complex and coloured patterns like those of a carpet appear, but *not* of any carpet distinctly remembered or lately seen; and in two or three instances in which this has been the case the pattern has not remained constant, but has kept changing from instant to instant, hardly giving time to apprehend its symmetry and regularity, before being replaced by another; that other, however, not being a sudden transition to something totally different, but rather a variation on the former."

Thus far I have spoken of rectilinear forms; with myself, however, curvilinear forms more frequently present themselves. These so closely resemble the spectra which Sir John describes as having presented themselves to him when under anæsthetic influence, that I again quote his words:—

"The indication," he says, "by which I knew it (the chloroform) had taken effect consisted of a kind of dazzles, immediately followed by the appearance of a very beautiful and perfectly symmetrical Turk's-cap pattern formed by the intersection of a great many circles outside and tangent to a central one. It lasted long enough for me to contemplate it so as to seize the full impression of its perfect regularity, and to be aware of its consisting of exceedingly delicate lines, which seemed, however, to be not single but close assemblages of coloured lines not unlike the delicate fringes formed along the shadows of objects by minute pencils of light. The whole exhibition lasted, so far as I could judge, hardly more than a few seconds."

On the administration of chloroform a second time, after an interval of many months, "the Turk's-cap pattern again presented itself on the first impression, which I watched with some curiosity; but it was not quite as complete, nor was it identical with the former. In the intersections of the circles with each other I could perceive small lozenge-shaped forms or minute patterns, but not clearly enough to make them well out. On both these occasions the colours were lively and conspicuous . . . .

Since that time circular forms have presented themselves spontaneously of the shadowy and obscure class. On one occasion circular were combined with straight lines, forming a series of semicircular arches, supported by, or rather prolonged beneath into, vertical columns, while another series of arches and uprights, darker than the general ground, appeared, intersecting the former, so as to have the dark uprights just intermediate between the bright ones of the first set. On the second occasion the pattern consisted of a very slender and delicate hoop, surrounded with a set of circles of the same size, as tangents to the centre circle and to one another. On the third occasion the whole visual area was covered with separate circles, each having within it a four-sided pattern of concave circular arcs. All these phenomena were much fainter than in the chloroform exhibition."

The accuracy of these descriptions will be readily admitted, as far as my own observations have enabled me to judge. I am, however, disposed to believe that the forms under which the spectra present themselves vary persistently in different individuals to a considerable extent.

A question now naturally arises: What are these spectra, and how are they formed?

An eminent scientific authority has suggested to me that they are *possibly* referable to that obscure mental process which Dr. Carpenter has termed "*unconscious cerebration.*" (*See* "Human Physiology.") But, allowing this to be the case, the questions put by Sir John Herschel still remain unanswered:—

"Where do the *patterns* or their prototypes in the intellect originate?

"If it be suggested that a kaleidoscopic power of forming regular patterns by the combination of casual elements, exists in the sensorium, how is it that we are unconscious of the power—unable to use it voluntarily—only aware of its being exerted at times in a manner in which we have actually no part but as spectators?"

I cannot help thinking that more than one of the most ancient types of symbolism upon which so much learning and ingenuity have been expended in endeavours to invest them with mystical meanings, or to trace their origin in the forms of the organic world, *may* have been first suggested by these hitherto unnoticed spectra.

But besides these geometrical forms, there are others, which I must again describe in Sir John Herschel's words:—

"I fancy," he writes, "that it is no very uncommon thing for persons in the dark, and with their eyes closed, to see, or seem to see, faces and landscapes. I believe I am as little visionary as most people, but the former case very frequently happens to myself. The faces present themselves voluntarily, are always shadowy and indistinct in outline, for the most part unpleasing, though not hideous, expressive of no violent emotions, and succeeding one another at short intervals of time, as if melting into each other. Sometimes ten or a dozen appear in succession, and have always, on each separate occasion, something of a general resemblance of expression, or some peculiarity of feature common to all, though very various in individual aspect and physiognomy. Landscapes present themselves much more rarely, but *more distinctly*, and, on the few occasions I remember, have been highly picturesque and pleasing, with a certain, but very limited, power of varying them by an effort of will, which is NOT the case with the other sort of impressions. Of course," he adds, "I am now speaking of waking impressions, in perfect health, and under no sort of excitement."

There is, of course, as Sir John Herschel observes, *one marked distinction* between these spectra and the *abstract* forms referred to at the beginning of this paper: "the human features have nothing abstract in their form, and they are so intimately connected with our mental impressions that the associative principle may easily find, in casual and irregular patches of darkness caused by slight local pressure on the retina, the physiognomic exponent of our mental state. Even landscape scenery, to one habitually moved by the aspects of Nature in association with feeling, may be considered in the same predicament. We all know," he adds, "how easy it is to imagine faces in casual blots, and to fancy pictures in the fire."

However this may be, I am inclined to think that we have here an, as yet, unacknowledged source of many widely-prevailing conceptions of the "world unseen."

If we are to believe, with the eminent German mythologist, Dr. Swartz, that there was a time, strange as it may now appear, "when men had not yet learned to suspect any collusion between their eyes and their fancy;" when fast-scudding clouds were flying horses or fleeting swans; when the rolling masses of vapour in the west, as the day declined, were mountains in the far-off cloud-land—not in the sense of poetic figments, but in sober reality—we can scarcely doubt but that the shadowy resemblances of which we have just spoken would be, in like manner, regarded as real existences.

Even stopping short of this extreme view of the case, I think it is difficult to suggest a more probable origin for that universally prevailing belief, which peoples the darkness with shadowy forms —the thousand fleeting shapes which

> Make night hideous;

or of that equally wide-spread faith in the existence of hidden realms of enchantment, of which we have types in the mystic caves of Eastern story, and the glimpses of fairy-land in our own folk-lore.

It will be observed that the phenomena above described present themselves in *health*, and in the *absence* of *all* excitement.

Where these two conditions are wanting, both voluntary and involuntary spectra present themselves with greater frequency and distinctness. Medical works abound in such cases, and Sir J. Herschel gives several suggestive examples from his own personal experience, which space forbids my quoting here.

There is, however, one point to which he refers which should not be overlooked. Whatever views we may be disposed to entertain respecting either the mental conditions in which these phenomena originate, or the external agencies by which these conditions are produced or modified, there is reason to believe that the appearances themselves ARE really formed upon the retina of the eye, and THUS they may be fairly placed in the category of "THINGS ACTUALLY seen."

H. M. C.

MORE ABOUT PRIMROSES.

LAST year there was a small discussion in the pages of SCIENCE-GOSSIP as to the origin of the common Oxlip, Mr. Britten surmising it to be a development of *Primula vulgaris*, whilst I looked upon it as a hybrid with the Cowslip. Many correspondents seemed interested in the subject, and I have myself paid more attention to it this spring; and I believe now that we were both of us right, and that there are *two* distinct forms, or rather origins, of the Oxlip; one rightly called *P. vulgaris—b. caulescens*, which is simply a Primrose become umbellate; and another, which is really a hybrid, and should be called *intermedia*. I find, however, that I am not the first to have given it the name, though I did not know this last year, and took credit for it. I have found examples that have no character in common with the Cowslip, and I have a plant in my garden that I am pretty sure was an ordinary Primrose last year, and this year produces a few caulescent umbels amongst the simple scapes. The flowers of this plant do not differ in the slightest degree from those of a common Primrose, but other Oxlips have more or less the colour, odour, and general characters of a Cowslip.

Just as certain Oxlips may be developed Primroses, there are others which it is only fair to suppose may be developed Cowslips, and not hybrids; for one not unfrequently finds examples which only differ from the Cowslip in size of flower, or in the corolla being nearly flat instead of cup-shaped. These may well be called *P. veris—b. major*. In the "London Catalogue" that used to be published by the extinct Botanical Society of London, the arrangement of the genus *Primula* seems to me to be very rational, and the one that should be adopted always. It is as follows, but I have added explanatory English names:—

Primula vulgaris	Common Primrose.
" " *b. caulescens*	Oxlip, developed form.
" " *c. intermedia*	Oxlip, hybrid form.
" *elatior*	Bardfield Oxlip.
" *veris*	Cowslip.
" " *b. major*	Oxlip, developed form.

The leaves of Oxlips, as far as I have observed (except *P. veris—b. major*), always resemble Primrose leaves more than Cowslip leaves, being produced at the base, and not ending abruptly. This favours the theory of all Oxlips being caulescent Primroses; but I have an instance of a true Cowslip with some of its leaves so produced at the base as not to be distinguishable from Oxlip leaves, and it is quite possible that the leaves may always resemble those of the hardier parent.

I am very anxious to see the genuine *P. elatior*, and I should take it as a favour if some correspondent would send me a flower and leaf of the plant (if not too late), wrapped round with a little damp moss. My address is Mobberley, Knutsford.

Amongst Primroses that I have observed this spring, are some which are intermediate between pin-centres and rose-centres; the stamens and the stigma being equal in height, and both half-way down the tube of the corolla.

Monstrous forms of Primroses, such as a second perfect flower produced from the eye of the Primrose, and examples where from three to six supernumerary petals were formed amongst the others, have been very common this spring. I have set it down to a luxuriant growth induced by the excessively mild and moist winter we have had; and so early were the Primroses that I found many roots in full flower in woods in the middle of December. One Primrose was brought to me that had only three petals. It gave the flower a very strange appearance, and looked very much like a small Trillium.

ROBERT HOLLAND.

VARIATIONS IN LEAVES.—I do not know whether our British plants are in any way affected by the favour lately accorded to variegated leaves; but I have noticed many pretty variations in my walks this year. A large elder tree had all its *young* leaves beautifully variegated with green and yellow; but this is entirely confined to them, the later leaves being of the usual colour. I may also mention a branch of maple, with full-sized leaves, prettily blotched with white and red; and two small sprigs of spindle tree, with leaves partly yellow and partly green, in some cases half of one colour and half of another. The variation of elder is permanent; the others I have noticed this year for the first time.—*B.*

STINGS AND POISON GLANDS OF BEES AND WASPS.

THE general structure of the sting of the bee and of the wasp is well known to every one who possesses a microscope, and who has a fair collection of mounted objects. There are, however, in the structure of stings, as in other objects, several interesting particulars which are very likely to be overlooked except by those who prepare their own dissections, and who take greater delight in becoming acquainted with the physiological characters of insect structure than in being the possessors of the finest set of entomological preparations which the professional mounters can supply. However beautiful an object may be when well prepared, and mounted in balsam with skill and taste, it falls very far short of supplying the interest and instruction which it affords when just dissected, and in water, with all its attachments, many of which are either washed or torn away in the preparation for mounting, or from their nature become almost invisible when flattened out and set in balsam.

These observations apply with full force to the stings of bees and wasps. The stings themselves, with their barbed lancets, are best displayed after they have been bleached in turpentine, flattened out, and mounted in balsam; but then this treatment either destroys the poison bags and poison glands, or renders them too transparent, and so almost invisible.

The chief points of interest in the examination of a sting, with its attachments, are the sheath, the lancets, the poison bag, and the poison gland. The humble bee affords the largest and best example of these, which may be taken as standards of comparison with those of other bees, and of wasps.

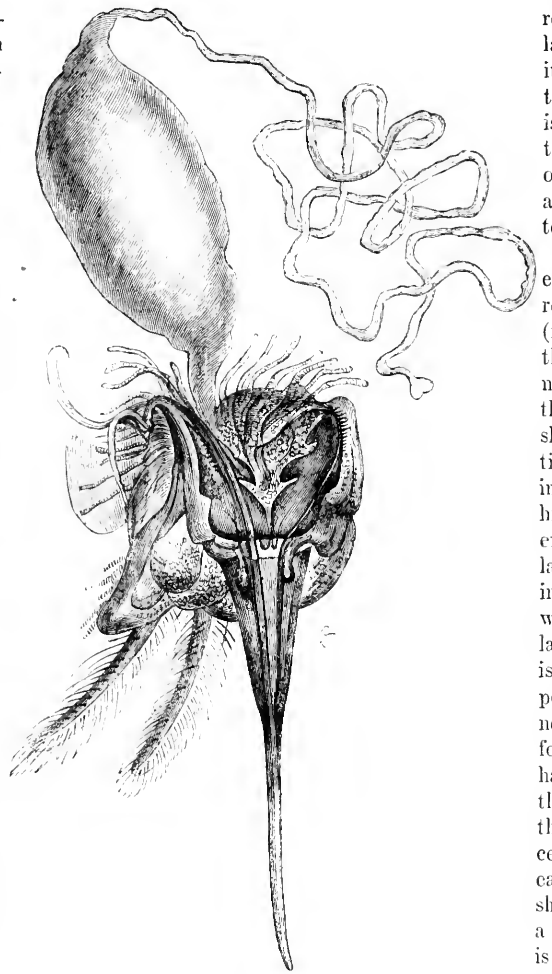


Fig. 139. Sting, poison bag, and poison gland of Humble Bee, × 20.

The sheath is large, especially at the upper portion; it usually contains two lancets that lie loosely within, and pass out to some distance behind, where they are attached to a system of levers and muscular bands, that acting on the lancets, at the will of the insect, give them a motion inside and along the body of the sheath, and cause the barbed points to project below the point of the sheath, and again as quickly to recede. The motion of the lancets is said to be alternate, the one advancing while the other is receding. One of the lancets may be traced in its natural position in the figure, but its point is concealed in the dark tip of the sheath. The other I have extracted, and figured separately, to show its form.

Near the middle of each lancet there is a remarkable projection (fig. 140), which, when the lancet is in its natural position, lies in the wide portion of the sheath. Similar projections will also be found in the lancets of the hive bee, but they are entirely absent in the lancets of the wasp, and in those of some of the wild bees. In these latter cases the sheath is narrow in the upper portion, there being no necessity to afford space for such projections. It has been conjectured that their use is to direct the motion of the lancets. The lancets have each one edge thin and sharp, like the blade of a knife; the other edge is notched at the point with seven or eight sharp teeth, the tips of which point upwards. Near the centre each lancet is strengthened by a stout rib, speaking of which, a well-known microscopist says, "The centre of the lancet is tubular, and carries a fluid in which bubbles are visible." To form an opinion on this point it becomes necessary to examine the lancet under a high magnifying power.

The figure subjoined represents the tip of a lancet

mounted in balsam (fig. 141); of course neither fluid nor bubbles could be seen; the central rib might indeed be interpreted as being hollow, but what the nature of a fluid in such a position as inside

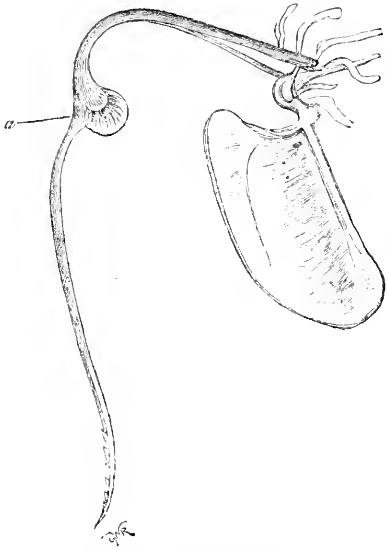


Fig. 140. Lancet of sting of Humble Bee × 25.
a, Projection of lancet.

the tubular rib might be, or what purpose it might serve, it would be difficult to conjecture, for it is

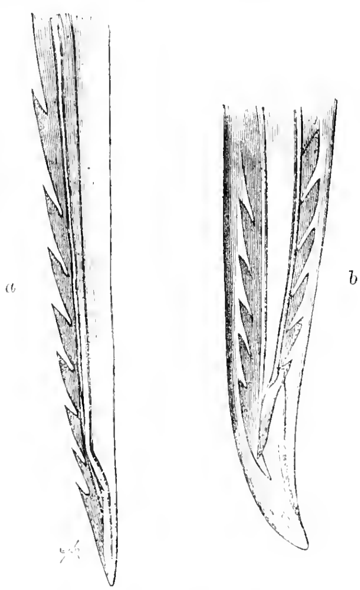


Fig. 141. a, Lancet of Wasp sting × 120.
b, End of sting, with lancets enclosed, × 80.

admitted that the poison issues from the bag to the sheath, and passes down in a groove between the two lancets. That the central rib is hollow I think there can be no doubt; that there may be an aperture at the tip of the lancet is quite possible, but difficult of proof; and that the internal fluid may be the poison is a legitimate hypothesis, until it can be proved that the poison from the bag could not find its way into the hollow centres of the lancets.

The difficulty in the dissection is this, that it is almost impossible to trace the course of the neck of the poison bag, in its passage among masses of muscular fibres, to its end and exact point of attachment. This difficulty has, I believe, been met by some simply by cutting the knot they could not loose, and by giving illustrations of hypothetically apparent attachments where none could possibly be traced or seen.

At first sight, and upon superficial inspection, it would appear that the arrangements of the levers and muscular bands connected with the lancets of bees and wasps present considerable variety and many points of difference; but upon the close examination of many specimens it will be found that the plan of structure, although sometimes difficult to trace, is nevertheless similar in all cases. The nature of the mechanism is best displayed in the sting of a wasp that has been well prepared, mounted in balsam, and so placed as to give a side view of the structure. Those who possess numerous preparations of ovipositors from ichneumon flies will find among them the most beautiful examples of a similar mechanism.

The poison bag of the Humble Bee (fig. 139) is very large, and pear-shaped; its remote end passes into a very long gland that, after many convolutions, closes in a blind end.

It is not easy to separate the gland from the tracheæ, &c., with which it is entwined, nor to trace its course in its many convolutions.

Viewed with transmitted light, the tracheæ, being filled with air, appears quite dark in colour, whilst the gland itself is semi-transparent. This difference enables the microscopist to distinguish both with ease; but to separate the gland from the tracheæ, and to determine whether it is single or bifurcate, and has two ends, requires careful manipulation. In the dissection from which I have drawn the figure the gland appears to be single; but then, although I used every caution, I cannot say that some portion may not have been torn away among the separated tracheæ.

The poison bag of the Hive Bee is similar, but the gland not so long as that of the Humble Bee. The Carder Bee, one of the wild bees, has also the poison bag; but the gland in this case, as in some others, at a short distance from the bag bifurcates, and then there are two glands each, with the usual blind end.

In the Wasp there are remarkable differences; the poison bag, instead of swelling out at once, and being very near the body of the sting, is attached to the sting by a hollow duct of some length; the bag itself is smaller than that of the Humble Bee, and *it does not terminate in the usual long gland* (see fig. 142), but is, like the poison bag of the Spider, to which it bears a great general resemblance; and *as far as the remote end is concerned*, the poison bag of the Wasp, as of the Spider, notwithstanding the objections of some of the correspondents of SCIENCE-GOSSIP, may, in popular terms, be not inaccurately described as a *closed sac* — the usual terminating long gland in both cases being entirely wanting. That there are secreting organs there can be no doubt, but then their position and character in these two cases are perhaps yet to be determined.

The poison bag of the Wasp is usually covered with muscular fibres set transversely, and so closely and firmly attached to the bag that they could not be separated from it without the tearing of the whole to pieces.

In some cases the fibres have free ends which completely obscure the outline of the bag. In several instances the terminating end of the bag seemed to turn inwardly, and a sort of knot lay inside the bag, and was joined to its end by a very short tube. In one particular instance I have found the bag to be formed of very clean skin, without any covering of muscular fibres, and when mounted in balsam, and examined as a polariscopic object, there appeared in the internal knot of the bag the crystals of which I have given a note in a former number of SCIENCE-GOSSIP. Of these crystals I now give a figure (fig. 143).

Fig. 142. Sting, lancets, and poison bag of Wasp × 25.

I have not been able to repeat this instance and obtain a similar specimen.

Lastly, I would observe that although there is little difference in the appearances of the sting as seen in water, dry, and in balsam, except in point of transparency, it is not so with the poison bag and poison gland. In water, the bag appears to be a simple membrane; when dry, the muscular covering becomes very distinct; and when in balsam, the bag and gland very often become scarcely visible, except in some cases in which they [illegible] with the usual [illegible] of good [illegible] objects.

Before closing this paper, I would [illegible] to the chief points of difference [illegible] the sting [illegible] and that of the Humble Bee or Hive Bee. In the Wasp the sheath is narrower above, the lancets have no central projection, the poison bag is not close to the body of the sting, but separated from it by a hollow cord, and the long poison gland that usually proceeds from the end of the poison bag is entirely wanting.

I have endeavoured, in simple language, to give a plain account of stings and their attachments, not as obtained from artificially set specimens, but from many practical dissections; and although it may be impossible to explain the use of every structure, or the mode of operation of every mechanism, still it is the privilege of every competent observer to direct attention to facts

and features that, simple as they may seem, may hereafter be of importance when interpreted to

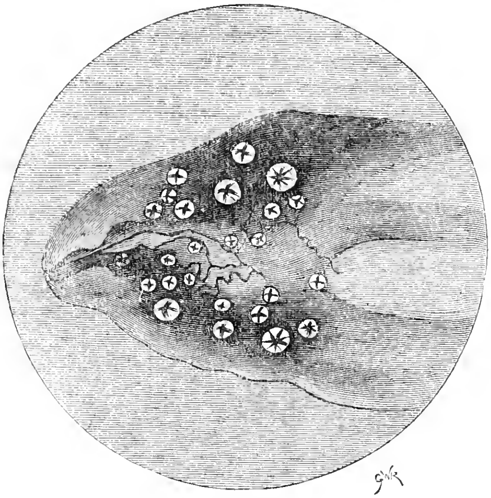


Fig. 143. End of poison bag of Wasp, as a polariscopic object, × 40.

the establishment of the laws of which they are examples.

Armagh. LEWIS G. MILLS, LL.B.

MONSTROSITIES IN EGGS.

THE double egg described by Mr. A. Hawkins is of occasional occurrence. I have even heard of a treble egg, each being perfect with its yolk and germ. I have seen the germ extracted from an internal egg, so that it is possible that it might be hatched, although I have not heard of an instance. Air is believed to be necessary for the development of the germ (hence the porosity of the shell in most eggs), but the wrapping of albumen might not entirely exclude air from the internal egg, and moreover an air bubble (follicle) is usually found in these monstrous eggs. Very little if any air must be necessary to the development of some chicks; how, otherwise, would the chicks of the emeu, mooruk, and ostrich be formed? The eggs of the latter, especially, have sometimes no visible pores, being smooth and dense like ivory. That these eggs must be practically so is obvious from their keeping fresh for two years, without any varnish or grease; and it is probable that they are susceptible of being hatched for some months after being laid. There is a great difference, however, in the appearance of the eggs laid in Northern and Southern Africa; hence some naturalists have inferred a distinction of species in the parent birds; but this has, I think, yet to be established. The eggs from North Africa are smooth, and without punctures; those from South Africa are deeply punctured. I have one from Central Africa where the punctures are much less marked. The North African eggs are larger than those in the South, but considering the number of eggs that are obtained, there is wonderfully little difference in size. Some time ago, at the British Museum, Mr. George Gray, F.R.S., showed me one of half the normal size; neither of us had seen another. Abnormalities in the eggs of the emeu are perhaps rather more common, but still very rare. I have lately obtained two, taken in the heart of Australia, of the *D. eroratus*, the spotted emeu. These had been two years unblown; one was half the natural size, the other was pinched in in the centre, being a sort of twin egg, and one-third less in bulk than usual. We have much to learn yet on the causes of these abnormalities. I have been at pains to collect all the monstrosities in eggs I can get for the last fifteen years. It is wonderful what extremes of size we find in those of the common hen. I have one little above the size of the wren, and another four ounces and a quarter in weight. Some are very fantastic in shape, being like a thistle-head or pippet funnel in form, either straight or curved; others remind us of a cow's horn; and a few are crumpled into deep furrows. Some of the smallest eggs have been laid, to my certain knowledge, by an old hen, which, having given over the normal duties of laying and incubation, thought proper to assume a bastard male attire, and was soon dubbed a cock: this was in autumn. In the following spring she laid three eggs, rough shelled and yellow, very round, and not exceeding an inch in length. She was a "cockatrice" indeed, but her eggs being blown, were found to contain neither yolk nor germ.

I have several nests of eggs containing abnormal examples intermixed with normal ones; thus a greenfinch's nest contains one egg of a quarter the natural size, with the concentrated spotting of a full-sized egg. A second nest has one egg entirely without spots. These aberrations are commonly attributed to fright, weakness, or maternal anxiety, but we want something more definite. The theory so strongly dwelt on by M. Baldamus affords a solution for many difficulties connected with the form and colouring of birds' eggs. It is as old as the days of Jacob and Laban, but was then applied to another class of animals. It supposes an impression made on the sensorium of the female cuckoo by the sight of the eggs in the foster-parents' nest, which influences the colouring of hers, and induces an approximation in hue between them. When a cuckoo lays in a hedge-sparrow's nest, whose eggs are blue-green, her egg is greenish, as also in that of the reed or sedge warbler, and in that of a tree pippit, whose eggs are olive or reddish, those of the cuckoo approximate towards this colour; and in those of the pied wagtail, whose eggs are white, spotted with ash, a similar approach to the ash

colour is seen. I give these few birds as typical cases, but I could instance many more where the coincidence of colour is very striking. I have nearly forty cuckoos' eggs taken *in situ*, and have compared full sixty more with like success. I mention this in hope that some of your correspondents may be able to bring forward instances in support of this curious theory.

C. O. G. Napier.

CADDIS-WORMS AND THEIR CASES.

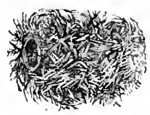
By R. McLachlan, F.L.S.

Amongst the many marvels of insect-life, none are more curious than the devices whereby the otherwise defenceless larval condition is enabled to sustain itself in the struggle for existence. To enumerate even a few of these would require more space than could possibly be allotted to me here; and, moreover, my present subject is connected with one particular means of defence,—the building by the larva of a house in which it constantly lives, and under the protection of which it can, in most instances, roam about at its pleasure in search of food. But few Coleopterous larvæ are architects; but, notably, some beetles (*Clythra*, *Cryptocephalus*, &c.) form a case which acquires great hardness and solidity. Many Lepidopterous caterpillars live in self-made houses, sometimes formed of a coarse silk secreted by them, but more generally of vegetable matters fitted on to the outside of a silken tube, or lined with silk. The small moths of the genus *Coleophora* all possess this habit, and also the whole of the singular family *Psychidæ*. For these larvæ the Germans have invented the very expressive term "Sackträger." With these I have nothing to do here. This paper is intended to elucidate the habits of the insects known as Caddis-flies, by some considered as a separate order, and termed *Trichoptera*; by others placed as a division of the great order *Neuroptera*.

Every disciple of "the gentle art" is familiar with Caddis-worms, which, when divested of their fortresses, form *bonne-bouches* to most fresh-water fish. But though these creatures are so well known, there remain much ignorance and popular misconception of their actual habits. With one or two exceptions, all larvæ of Caddis-flies are aquatic, and reside in fresh waters; some frequenting ponds, lakes, &c.; whereas others delight in the turbulence of the most impetuous torrents and waterfalls. With the assistance of our artist, I here attempt to familiarize my readers with some of the more usual and striking forms of cases. Firstly, in ponds and slowly-flowing canals, one frequently finds long cylindrical tubes formed of pieces of leaves and other vegetable matters neatly arranged in a spiral form, left to right, or *vice versâ*. These are formed by species of the true genus *Phryganea*, and by some allies. Cases of this kind are nearly of equal diameter throughout, and the larval inmates have the power of turning themselves, and thus of presenting their heads at either end (fig. 144). Species of the genus *Limnephilus* make what are, perhaps, the most familiar cases; viz., those formed of shells, seeds, pieces

Fig. 144. Case of *Phryganea grandis*.

of wood and rushes, twigs, &c., arranged in various order. A tolerably common case is that of *L. rhombicus*, which uses pieces of moss, cut lengths of rushes, &c., and arranges them in a transverse and somewhat oblique direction, forming very bulky masses (fig. 145). A very abundant species, *L. flavicornis*, also frequently forms a similar case, but it by no



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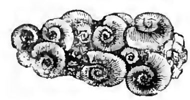


146.

147.

148.

149.

150.

151.

Fig. 145. Case of *Limnephilus rhombicus*.
Figs. 146 to 151. Cases of *Limnephilus flavicornis*.

means confines itself to the use of vegetable matters only; for most of those beautiful shell-structures so common in ponds and deep ditches are the work of this insect. It seems to be a most capricious creature, sometimes selecting myriads of some one species of minute shell or seed, with which it builds its house entirely; again, it appears to form a fancy building made of many substances, but at pretty regular intervals; again, it will use almost any substance, vegetable, animal, or mineral, and work

the whole together heterogeneously, without the slightest semblance of order. A conchologist might frequently examine these cases with profit, for a good miscellaneous shell-case will give a better idea of what fresh-water *Mollusca* may inhabit any particular spot than probably would hours of dredging and searching. It matters little whether the shells be empty, or still contain their proper inmates; these latter must submit to be dragged about at the will of the creature that has thus unceremoniously pressed them into its service; and if they do not die in that position, they must patiently await the time when, after the escape of the perfect insect, the binding materials of the case may rot, and set free the various matters composing it. The cases of smaller species of the same family are also frequently appropriated (figs. 146 to 151). Several cases, all of which probably pertain to this species, are here figured from specimens in my collection. Another common form of case is that made

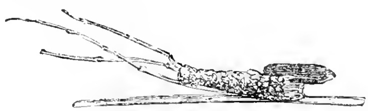


Fig. 152. Case of *Limnephilus lunatus.*

by *L. lunatus* (fig. 152) and *Anabolia nervosa* (fig. 153). This consists of a tube made of sand or shell fragments, to the outside of which are attached long

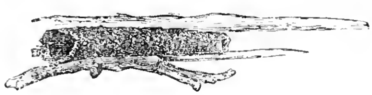


Fig. 153. Case of *Anabolia nervosa.*

twigs, husks, or pieces of wood, as balancers; the twigs often extending far beyond one end of the tube. One colony of *L. lunatus*, dwelling in a dike under a beech-tree, had appropriated the empty and open husks of the beech-mast, and it was ludicrous to see these latter moving about at the bottom by an agency that was not at first very apparent.

A not very abundant case, sometimes to be found in ponds, is formed of entire leaves or large pieces, usually of sallow or poplar, also sometimes of pieces cut out from the stems of bulrushes, &c., and laid more or less flat over each other, forming broad flattened masses, in the interior of which is the slender tube containing the larva: this is the work of *Limnephilus pellucidus* (fig. 154).

Straight or curved tubes, uniform, or gradually tapering at one end, and formed of sand or very small stones neatly cemented together, are very common, and some of them are very elegant objects: they are formed by various species of *Limnephilus*, *Stenophylax*, *Sericostoma*, *Leptocerus*, *Setodes*, &c. &c.; but space forbids me to enter more fully into their peculiarities. Some species of *Setodes* make delicate little tubes, entirely formed of silky secretion, without any mixture of extraneous matters. Occasionally one may find short *quadrangular* cases,

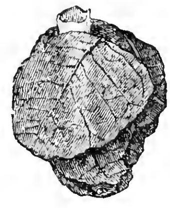


Fig. 154. Case of *Limnephilus pellucidus.*

Fig. 155. Case of *Stenophylax.*

formed of vegetable matters, the angles being well marked. It is not yet certain what species manufacture these.

Fig. 156. Case of *Sericostoma.*

Fig. 157. Case of *Setodes.*

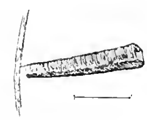


Fig. 158. Quadrangular Cases.

The most extraordinary of all British cases is that formed by *Molanna angustata* (fig. 159), which is not uncommon in ponds, especially those with a sandy bottom. It is long, broad, and flattened, and

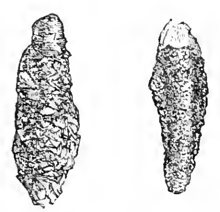


Fig. 159. Cases of *Molanna angustata.*

formed entirely of fine sand; the upper surface, at the anterior end, projects considerably beyond the lower; thus forming a cover, protecting the larva when it protrudes its head and anterior segments in search of food. An allied case is found in Ceylon; only in this the case proper is a slender tube, to the upper end of which is attached a broad semicircular shield, convex above and concave beneath, answering the same protective purposes (fig. 160).

The minute insects of the genus *Hydroptila*, so

often mistaken for *Micro-Lepidoptera*, construct little flattened seed-like cases almost wholly of silk, with a slight external coating of sandy particles.

All the cases of which I have yet spoken are portable, and are carried about by the inmate from place to place, being fixed to stones or water-plants when the metamorphosis to the pupal condition is about to take place. But there is yet another class of cases. Almost any time during the year, if we lift up a moderately large stone at the bottom of a stream, we see attached thereto what appear to be elongately-oval masses of small angular stony fragments, arranged without any particular order.

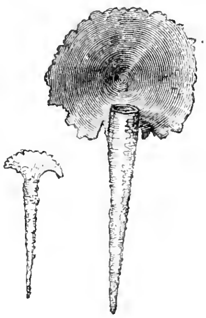


Fig. 160. Ceylon Cases.

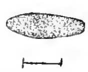
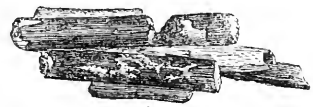


Fig. 161.
Case of *Hydroptila*.

Fig. 162. Case of *Rhyacophila*.

These are the cases formed by the species of *Hydropsychidæ* and *Rhyacophilidæ*, and are constantly fixed. The species of *Rhyacophila* can sometimes be scarcely said to form a case at all when in the larval condition, living almost free under stones, and constructing a case only when about to change. The *Rhyacophilidæ* are remarkable for the pupa being contained in an elongate brown cocoon inside the case; in all others the pupa lies free.

I have previously mentioned that there are one or two exceptions (which prove the rule) to the aquatic habits of Caddis-worms. The authenticated instance is that of *Enoicyla pusilla*, the larva of which lives in a slightly-curved sand-tube amongst the moss at the roots of trees. This has not been considered a British insect; but, almost at the instant of penning this paper, I have received from Mr. Fletcher, of Worcester, larvæ and their cases which I scarcely hesitate to attribute to *E. pusilla*. He found them near the roots of willows. The female of this exceptional species, as regards habit, is exceptionable otherwise, inasmuch as she is wingless. My larvæ are, as might be expected, destitute of the usual branchial filaments, and probably breathe by means of spiracles, as do caterpillars.



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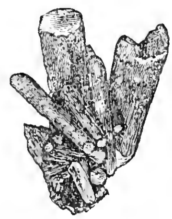

164.

Figs. 163, 164. Cases of *Halesus digitatus*.

It now remains to me to speak briefly of a peculiar instance of form belonging to extra-British species. In the streams of Southern Continental Europe, and of various other parts of the world, are to be found little cases formed in shape of a small snail-shell. These are termed *Helicopsyche*, and have only recently been proved to be the work of Caddis-worms, they having been repeatedly described as the shells of *Mollusca*, under various names. Caddis-worms have six legs, attached to the three thoracic segments, which, with the head, are of a horny texture above, these forming that portion of the body protruded when the creature is feeding; the abdomen is soft, the first segment usually carrying three humps, one median, and one on each side, which serve, with the assistance of the hooks at the extremity, to prevent the larva being dragged from its case; so that it is often impossible to eject without introducing a twig into the tail-end and pushing it forward. They breathe by means of branchial filaments, usually placed along each side of the body; but for details on the anatomy I must refer the reader to Pictet's magnificent work, "Recherches sur les Phryganides." The water is admitted into the case by means of a silken grating. Their food, as a rule, consists of vegetable matters, but some are certainly more or less carnivorous, and they have been accused of destroying salmon-fry, with what justice I know not.

I have but few suggestions to offer as to breeding these insects, having been, as a rule, signally unsuccessful; but Pictet managed to rear numerous species, of which he figures the metamorphoses. Those that frequent still waters should not be diffi-

cult to rear in an ordinary aquarium, taking the precaution to place but few together; and here they may sometimes be forced to build their houses of any fancy material, at the will of their possessor. The stream- and torrent-loving species are far more difficult to manage, but they might probably thrive in an apparatus similar to that, now so well known, used in breeding salmon artificially.

Fossil cases of *Phryganidæ* have been discovered; but it is possible that some curious objects, doubtfully referred as fossil Caddis-cases, are in reality tubes formed by the ebullition of gases in volcanic mud cooled very suddenly. Some objects once submitted to me seemed certainly to have been so formed.

I believe I have said enough to prove to any dweller in the country the existence in the waters around him of an inexhaustible field of amusement and instruction. Of a truth there are "books in the running brooks"!

NOTE ON CHÆTOSPIRA.

By F. C. S. Roper, F.L.S., &c.

I HAVE been much interested by the figure given by Mr. Tatem, in your last number, of *Chætospira Mülleri*, as it proves that I found this species as early as 1851, or five years prior to its being described by Mr. Lachman. At that time I only met with a single specimen, drawings of which I sent to several naturalists, but without being able to ascertain its name. I hardly thought it justifiable to publish a description of it as a new species without further evidence, and have never met with it again in the same or any other locality. I had overlooked the figures given in the last edition of Pritchard, which but slightly resemble the species as I found it; but it most closely resembles that figured by Mr. Tatem, and has the peculiarity of having been found living in quite a different position from any heretofore noticed, as both Mr. Tatem's and Mr. Lachman's occurred in cells of a species of Lemna.

From a note made at the time, I find my specimen was procured on the 28th May, 1851, in a pool on Snaresbrook Common, in Essex, and was found inhabiting a deserted tube of *Limnias ceratophylli*. The body was inclosed in a semi-oval or flask-shaped case inserted in the empty end of the Limnias tube, the spiral arm projecting about $\frac{1}{250}$th of an inch, having at first a tremulous motion, and when fully expanded assumed a true spiral form covered with long bristle-like cilia on the outer side. It was very sensitive to the slightest motion of the microscope, and contracted into its case with great rapidity, but protruded its arm very slowly like a Polype. The thickness of the tube it inhabited, and the short time I had it alive, prevented my making any clear observations on its internal structure; its motions and general appearance had, however, more the aspect of a fresh-water Polype than of any alliance to the Stentors, its near allies. It is not improbable that it may be found in many localities, but its very sensitive habit is probably the cause of its being overlooked, as its case would scarcely be noticed by any but a most careful observer, and the arm is only protruded after a considerable state of quiescence when placed in a live-box.

I rather conclude from Mr. Tatem's notice that he has been chiefly guided in its determination by the short notice in the last edition of Pritchard. I think, therefore, it may probably interest some of your readers if I append to this a short account from Claparede and Lachman of the genus and species of *Chætospira*.

The genus, it appears, was first described by Mr. Lachman in 1856, in Mueller's Archiv., p. 362, and in the "Etudes sur les Infusoires," by him, in conjunction with Mr. Claparede, published in 1858-9. The genus is placed in their family *Bursarina*. This family they divide into two sub-families—the first having more or less of a case or shell (coque) during part of their lives, the anus situated in the upper part, forming the first sub-family *Stentoriens*. The second has no case, and the anus is situated at the posterior extremity; this forms the second sub-family, or *Bursariens*, properly so called, and includes ten genera which I do not propose to notice. The first sub-family is then separated by these authors into two divisions, the first having a body not truncate, or with a large surface spread out at its summit; the second with a truncate body projecting from its summit, carrying the buccal ciliæ: this last forms the genus *Stentor*. The first division is again divided into two genera—first, with a buccal spire having the form of a narrow band, *Chætospira;* the second, buccal spire having the form of a large bilobe membranous expansion, *Freia*. The genus Chætospira is said to be clearly characterized among the Stentoriens by the fact of the buccal spire being carried on a process in form of a narrow band, at the base of which is found the mouth. They inhabit a shell or case, which they can quit at times, as M. Lieberkuhn asserts that he has often found them swimming freely in water.

Two species were described by Mr. Lachman: 1st, *Chætospira Mülleri* (Lachman, Mueller's Archiv., 1856, p. 364, Section xiii., figures 6, 7), having a tough flask-shaped (lageniforme) case, apparently horny; process when extended having more than one turn of a spiral. Found near Berlin, on *Lemna trisulca*. 2nd, *Chætospira mucicola* (Lachman, Mueller's Archiv., 1856, p. 364), case gelatinous, process when extended not forming a complete spiral turn.' In the latter genus the first ciliae of the spire

are longer than those that follow, and one especially attains a length and diameter little short of double that of the greater part of those towards the lower end. Found near Berlin, among Algæ.

THE MERLIN

(*Hypotriorchis æsalon*).

THE above engraving presents us with a faithful portrait of the Merlin, taken from a very fine old male. The Merlin is the smallest falcon met with in Great Britain, being more universally distributed in the winter. I have several specimens in my own collection, amongst which are two killed in this country,—one a young male, from Mr. S. Carter's collection, and the other a very fine old female, shot in January, 1866. My other specimens are from the Southern Volga, whence we have received of late years large collections from Herr F. Moeschler. The bird would appear to be tolerably common there, but I have unfortunately not got his paper published in "Naumannia" near me to look into, so I must content myself with giving the following note out of Demidoff's "Voyage dans la Russie méridionale," to which little-known work I have before had occasion to refer. This work contains very full notices of the birds met by him in South Russia and the Crimea, and will be found very interesting, as containing many valuable notes on the habits of several rare visitants to this country, which are common in the above-mentioned localities. He says that the present species is "common in all the provinces of South Russia, whence it only disappears in winter for a short time. I have seen, as late as the middle of February even, five or six together perched on the summit of the trees, but I never met with a single instance of its building in our steppes. The young are found in great numbers at the period of migration, in the months of October, November, and December, and one sees flights of them in the gardens as well as in the steppes. This bird keeps all the time of its accidental sojourn the place which it has once occupied. It is moreover easily recognizable by the manner in which, in the evening, it falls through the air like a thunderbolt, without the aid of its wings."

As we see from the above that South Russia does not form the habitual breeding-place of the Merlin, it will be interesting to consider the testimony of ornithologists on this point. That it occasionally breeds in Great Britain is well known. Last year some specimens of hawks' eggs taken on the ground near Ongar Wood, Essex, were brought to me as Merlins', and have been pronounced by competent judges to be the eggs of this species. Mr. J. H. Gurney, undoubtedly the first living authority on the "Raptores," tells me that the occurrence of a Merlin's nest so far south is interesting, and he never heard of one breeding there before, though he believes it breeds in Wales. I should add that Mr. Davy, of the Kentish-Town Road, from whom I purchased the eggs, tells me that he received a nest of young Merlins from the same neighbourhood about ten years ago. No instance has apparently occurred of the breeding of the Merlin in Norfolk, where Mr. Stevenson records it as a winter visitant. He remarks: "Several of these little hawks were observed in different parts of the county during the intense frosts in the winter of 1860-1, but apparently the only specimen obtained was a fine male, killed at Shottesham, on the 16th of January. In the following winter, however, of 1861-2, when the weather was almost equally severe, an adult pair were killed in January at Merton, and a female, also adult, about the same time at Marsham." In the winter, Mr. Briggs tells me, he used to meet with the Merlin at Billingbear Park, and shot several during his residence there.

The following remarks are taken from Professor Newton's "Ootheca Wolleyana." Speaking of the series of eggs in the late Mr. Wolley's collection, he says: "There are not many specimens in it, which, taken singly, could be pronounced from their appearance alone to be certainly Merlins'; but taken as a whole, a purple tint is seen to be prevalent, which is not discernible in the series of Kestrels' eggs lying in the same drawer, while the average size of these latter is also greater. It will be seen that the Merlin is also one of those birds of prey which are not constant in the choice of a locality for their nests, sometimes breeding (as in the British islands is, I believe, the usual habit) on the ground, at others in trees." The following remark of Mr. Wolley's is interesting, and I therefore extract it. With reference to six eggs taken in Sutherlandshire in 1852, he writes: "I received these beautiful eggs from one of the men who accompanied me when I was there, who says, 'the male was one of the wickedest I ever saw. It was like to pick out my eyes when going to the nest, and convoyed me about a mile on my way home. The nest was among the heather.' He also adds that it was about the size of a thrush; and from his description of the bird, and from the situation of the nest, there can be no doubt it was a Merlin. I am not sure I ever saw this bird whilst I was in Sutherlandshire, but I heard the nest of one described. It certainly is not common there. I think the partial colouring of these eggs remarkably fine." Mr. Wolley's collection also contained a series of Merlins' eggs found in Lapland and in East and West Bothnia.

Mr. Gould, who has given a magnificent illustration of this species in his "Birds of Great

Britain," remarks, "Although I did not succeed in finding the nest of the Merlin when I visited the Dovrefjeld, I am certain that the bird was engaged in feeding its young; for the old birds passed and repassed certain parts of the moor with a degree of regularity that attracted my attention; and as I sat on a stone watching them, I observed that they always took the same direction, coming and going from the scrubby parts of the country to the hill-side. The kind of food they carried home I was unable to ascertain; probably small birds. I did not perceive that they ever attacked the Fieldfare or the Redwing, although these were plentiful in the immediate neighbourhood."

Macgillivray observes: "This beautiful little falcon is by no means uncommon in many parts of Scotland. . . . . . The flight of this species more resembles that of the Sparrow-hawk than of the Peregrine Falcon. It sweeps along at no very great height, glides over the fields, shoots by the edge of the wood, examines the thorn-fence, and sometimes alights on a tree or wall, as if to survey the ground. Although it may occasionally pounce on a partridge, it usually preys on smaller birds, such as larks, thrushes, chaffinches, sandpipers, snipes, and plovers. . . . . . The crops and stomachs of all those which I have dissected contained exclusively small birds; but it is said to prey upon insects also, which is very probable, they being a favourite food of most small hawks."

The geographical distribution of *Hypotriorchis æsalon* may be summed up as follows:—

Iceland (*Newton*), Europe (*Gould et alt.*), Siberia (*Middendorf*, *Radde*), Algeria (*Loche*), Egypt (*Taylor*), Palestine (*Tristram*), Asia Minor (*Dickson* and *Ross*), South Russia (*Demidoff*), N. India (*Jerdon*), China (*Swinhoe*).

R. B. SHARPE.

Fig. 165. MERLIN (*Falco æsalon*). Male.

FIRE-FLY OF NORTH AMERICA.—A correspondent desires to introduce this insect into Britain, and wishes to learn in what condition it had better be imported, at what time of the year, and what constitutes its food. Will any one kindly furnish him with answers to these queries?

THE CUCKOO-SPIT.

TWO of these little insects (*Aphrophora spumaria*), known to be females by their full-length wing-cases, were removed in November from the garden to a small plant-case, with a view to discover where they lay their eggs. Their first efforts were to escape, but in a day or two they settled down to their usual quiet ways, sitting on the leaves to enjoy the brief autumnal sunshine, and then retiring among them. By the middle of December they had finally disappeared. One dead insect was afterwards found, but the eggs could not be discovered by the most careful search. They were certainly there, for half a dozen larvæ were hatched early in the following April. The conclusion arrived at is that the eggs are deposited in the ground about the roots of plants. They must be large for so small an insect, and therefore few in number, judging from the size of the newly-hatched larva. This at once commences operations on some juicy stem or leaf—no matter what, so it be sappy enough; thrusts in its long proboscis, pumps up the sap, blows it off in small bubbles through a pipe at the tail, and so speedily constructs for itself a cool, moist, translucent home. Here it revels in abundance through the spring months, when, grown to maturity, its first and only change is made. It ceases to renew the bubbles, its moist habitation exhales in the summer heat, the insect is glued to the twig, the skin splits, and it frees itself, leaving a perfect exuvium behind. Its appearance is not much changed, except in the important particular of colour, which is now a mottled brown. It is winged, and can make a short flight, throwing itself into the air, when alarmed, with a jerk of the hindmost legs. It lives in the sunshine on the leaves, only blowing a bubble into the air now and then, as in sport; but it continues probably to feed on the sap of plants, for its proboscis is retained, and in some few individuals a second is provided, like a child's second set of teeth, ready to take the place of the first when wanted (an interesting fact which deserves a fuller notice). Its skin is cast but once, and must therefore grow with it, and here may perhaps be seen a reason for its curious economy. The crickets and grasshoppers, which undergo a similar change, live in or near the ground, and find sufficient moisture there to keep their skins humid and pliant; but the cuckoo-spit, high up on the leaves and stems of plants, must provide itself a bath.

This little hopper can never be a favourite with the florist: it intrudes itself so perseveringly, unconscious of its bad name and questionable ways, into our gardens and conservatories; but the naturalist who studies the instincts of animals, and loves, may be, to trace the wideness of that tender care which is over even the most humble creatures, will regard it with complacency and interest. If a microscopist, he may place the young larva gently on the stage in a drop of water, and view by strong transmitted light its whole internal economy—the constant heaving of the blowing tube, the motion of the intestines, and the boat-shaped corpuscules of the blood circulating, not through veins, as in the frog, but along the interstices of the limbs and body. By a little management it can be brought to feed under the microscope, and display the spiral motion of the curious pump in its horny case between the eyes. The gauzy underwing may be mounted to be viewed by reflected light; it is a lovely opaque object with its delicate pearly lustre.

This season the larva is most abundant, and should be carefully, as it may be easily, studied.

S. S.

EXHIBITION OF INSECTS IN PARIS.

AN exhibition of useful and destructive insects is announced to take place in the Palais de l'Industrie, under the patronage of the Minister of Agriculture, during the month of August. It will be remembered that an exhibition of the same kind, on a small scale, was held in the same building in the year 1865, through the efforts of the Central Society of Apiculture; that first attempt gave rise to the formation of a new society of agricultural insectology, and it is this latter association which is entrusted with the organisation of the coming exhibition. The committee includes Dr. Boisduval, M. H. Hamet, M. Guérin Méneville, M. Focillon, and several other entomologists and scientific agriculturists. The exhibition is to be made as comprehensive as possible, the scheme including the propagation of useful insects, methods of curing or preventing disease, and economical management; and the illustration of destructive insects, with means for opposing their ravages. It is desired that each class should, if possible, be exhibited in all its transformations, from the egg to the perfect insect, together with the matters on which it feeds. Printed or written memoirs are also to be admitted, even without specimens of the insects to which they refer. As regards destructive insects, the society has determined on a practical instead of a scientific classification, the subdivisions being formed by the plants upon which the creatures feed. Two additional divisions are added to the programme of the exhibition; one including carnivorous insects, and small mammiferous animals, such as the mole and hedgehog, which feed on insects; the other being devoted to the illustration of the ravages committed by snails and slugs. Some idea of what this amounts to in the vine-growing districts of France, may be formed from the fact that thousands of bushels of snails are collected in the vineyards and sent to various markets

all over the country; during the summer months the supply of this popular article of food is large and continuous all over France. As upon the former occasions, conferences on various subjects connected with insectology, will take place in the exhibition. Foreigners are invited to take part in the coming exhibition, applications to be sent in before the 20th of July, to the secretary of the society, No. 1, Rue Cadette, Paris, or at the Palais de l'Industrie. The insects or other objects of exhibition are to be sent in before the 25th of July, and the exhibition opens on the 1st, and closes on the 31st of August. The following are the principal heads of classification:—First division—Useful insects:—1st class: Silk-producing insects. These will form the most important feature of the exhibition; the malady of the *gattine*, which has existed amongst the silkworms ever since 1848, is estimated to have caused a loss amounting to more than 60,000,000 francs, or nearly 2½ millions sterling per annum; 2nd class, Insects producing honey and wax; 3rd class, Insects used in dyeing and for colour; 4th class, Edible insects, crustacea, and molluscs; 5th class, Insects employed for medical use; 6th class, Insects used as ornaments. Second division—Destructive insects:—Ten classes, viz., those which attack cereals, the vine, plants used in industry, forage, vegetables and ornamental plants, fruit-trees, forest-trees, timber used for building, truffles and fungi, dry organic matters, and, lastly, parasites of man and domestic animals. The third division includes three classes—carnivorous insects, parasitic insects, destructive of chrysalides, and insectivorous animals, birds, and reptiles. The fourth division includes insects and other creatures destructive of molluscs, and notices respecting edible snails and the benefit that cultivators may derive from them. Lastly, optical instruments for entomological purposes, and special apparatus connected with the rearing or destruction of insects. Medals and honourable mentions will be awarded for the most remarkable objects exhibited.—*Journal of the Society of Arts.*

ANTS AT THE CRYSTAL PALACE.

On Friday, May 8th, while some workmen were removing the flooring of the passage in my house at Upper Norwood, they discovered an ant's nest built between two of the joists, and resting on the ceiling of the cellar below. No inconvenience had been suffered by the family; we only knew of the presence of our fellow-tenants from their passing in and out under the doorstep.

The nest seems to be composed of masticated wood, and, from the beams being much eaten away, there is every reason to believe that such is the case. If it be so, this is a singular specimen of industry, as the number of mouthfuls represented by the entire mass is utterly beyond computation. Every fine day numbers of *baby* insects may be seen as they are carried out for an airing by careful nurses, who, after a few minutes' promenade, return indoors with their charges. Occasionally, too, an ant may be seen passing in a contrary direction to the main stream, saluting every one it meets. All stop as they reach it, receive a stroke from its mandibles, and then hurry on as before.

They seem to have but little notion of locality, taking most circuitous routes when out of a beaten track, and often returning to their startingpoint. When first placed in their new quarters, groups would gather on various projections, stand on their hind legs, and apparently make a general survey, but no determinate policy resulted from it. At last a lump of sugar being placed near the nest, and too much water poured upon it, a stream of syrup ran down the side next the French Court; this the ants followed, and so found their way to the base of the column. They have since continued in this track, and on hot days thousands may be seen ascending and descending.

Ants appear to require abundance of water, and in their eagerness to obtain it, many at first fell into the tank which surrounds them. As this threatened a speedy extinction of the population, a wooden stage was provided, with slopes at intervals. Since then few accidents have occurred, and it is hoped the swarm may be preserved for some time to come.

An instance of their sagacity deserves mention. An ant, having fallen into the water, was on the point of drowning, when another, perceiving its danger, came to the rescue and drew it out again. Finding it too much exhausted to stand, it endeavoured to carry the sufferer home up the column. The burden, however, proved too great; so, after ascending a few inches, it was obliged to relinquish it; the patient fell down heavily, and remained senseless on the base. Its rescuer, however, immediately returned and made a second attempt, but was again overpowered by the weight. Another ant now perceived the difficulty, came to its assistance, and by united efforts the pair placed their friend in safety.

These ants seem to be generally of a harmless description, as I have had my hands completely covered with them without feeling any ill-effects. In one case, however, having pointed my finger towards a little fellow who stood guarding one of the entrances, he flew at it most savagely, and did his best to chastise my impertinence.

Should any one require further information, it will give me great pleasure to furnish it, if in my power; and I shall be thankful for the suggestions of any who have attended to the habits of these curious insects. Robert B. Holt.

French Court, Crystal Palace.

N.B.—The species is probably *Formica fuliginosa.*

ZOOLOGY.

HOOPOE (*Upupa epops*, Lin.)—A fine male specimen of the above was shot near here on the 23rd of April last; its stomach contained grubs, beetles, worms, and flies.—*G. S., Aberdeen.*

FURZE MITES.—I send with this a branch of furze, gathered near Virginia Water, about a mile hence, this morning, covered with the web of what I suppose to be the *Tetranychus ulicis*, described in SCIENCE-GOSSIP of March. Within will be seen eggs in multitude, with the acari in every stage of growth—the smallest green and the largest bright red in colour, as described by W. Spicer—the former with six, the latter with eight legs. Many of intermediate size appear in a state of torpor, resulting (may I suggest) from their undergoing a change of form, as numerous cast-off skins are scattered about. My but brief examination inclines me to believe that sex is indicated, not by the size, as surmised by Mr. Spicer, but by the colour, for I notice that many of the smallest dimensions are yellow-brown rather than green, and also that while some of the largest are of a rich red, other are paler and yellowish. It should be observed, also, that the web differs essentially from that of a spider in that it serves simply as a protection during change and covering from weather, and by no means as a mode of capturing their prey.—*C. H. White, St. Anne's Heath, Chertsey.*

HELIX POMATIA IN YORKSHIRE.—On the 26th of April a full-grown living specimen of this snail was shown to me which had been taken the day preceding in Forge Valley, Scarborough. Many years ago a few specimens were placed in the valley by the late Mr. Bean, and from time to time single individuals have been found there. The one I speak of is doubtless a descendant of the original transferred stock, so that it is not at all unlikely that the species may be spreading and becoming naturalized to the locality. I am not aware that any other attempt to establish it in the north of England has proved successful.—*C. Ashford.*

THE HAWFINCH IN BERKS.—At page 109, Mr. R. B. Sharpe takes exception to a statement of Mr. A. G. More in favour of Berks, based it is said on "observations taken near Cookham, Berks, and which have proved that the Hawfinch is a regular breeder in the Duchess of Sutherland's woods *at Cliefden*." As it is important to secure accurate observation and exact statement on such subjects, attention may be directed to a remarkable oversight on the part of this writer, who seeks to correct the somewhat careful and minute detail afforded by another. *Buckinghamshire* claims for its own the beautiful woods of Cliefden; in the quiet and unmolested recesses of which the Hawfinch doubtless finds a suitable retreat for the reproduction of its species; though it would appear it disdains not, for a less worthy object, to forage across the Thames into the neighbouring county of Berkshire, where the tempting green peas and plumbs in the gardens of Formosa attract it.—*H. G.*

LARGE ANODONTA CYGNEA.—Two specimens (from a pond in this locality) of *Anodonta cygnea* have recently come into my possession, whose extraordinary size make them worthy of mention. Whereas Forbes and Hanley give "six inches in length and about three in breadth" as the dimensions of "some of our larger examples," my examples measure—the one seven and a half inches in length and four and a half in breadth, and the other no less than eight inches in length and five in breadth. You may fancy what noble shells they are.—*Windsor Hambrough, Worthing.*

PODURÆ.—Having lately, through the kindness of a friend, had the quiet perusal of Sir John Lubbock's three papers on the Thysanura in the Linnæan Society's Transactions, I beg to offer the following corrections and remarks on my notes in SCIENCE-GOSSIP, vol. iii., on Poduræ. Fig. 37, on page 53, is *Isotoma trifasciata*. Figures 38, 39, 40, 42, and 48 all refer to *Lepidocyrtus* (probably *L. curvicollis*). Figures 41, 43, 44, 45, and 49 refer to some species of *Degeeria*, perhaps *D. nigromaculata*. Figures 46 and 47 refer to *Templetonia nitida*. Figure 50, and the note in SCIENCE-GOSSIP, vol. iii., page 45, "Is it a Podura?" refer to *Macrotoma plumbea*.—*S. J. M'Intire.*

SMALL SKIPPER.—On Friday, June 12th, I captured a male specimen of the Small Skipper Butterfly (*Pamphila linea*). Is not this very early? It does not, I think, generally make its appearance till the end of July.—*C. M. W.*

HERRINGS AND SHADS.—At the June meeting of the Zoological Society, Dr. Günther made some observations on the various species of *Clupea* found on the British coasts, which were stated to be five in number, namely, the Herring (*Clupea harengus*), the Sprat (*C. sprattus*), the Allice-Shad (*C. alosa*), the Twaite-Shad (*C. finta*), and the Pilchard (*C. pilchardus*). Dr. Günther showed that the Whitebait, which had been considered by several authors as a distinct species, and by Professor Valenciennes had been even elevated into the rank of a distinct genus (*Rogenia*), was nothing more than the young of the Common Herring. Dr. Günther likewise referred *C. Leachii* of Yarrell to a well-developed variety of the Herring, and stated his opinion that he supposed *Alosa squamopinnata* of Couch was a hybrid between the pilchard and one of the two shads.

RARE MICRO-LEPIDOPTERA.—Like many another lepidopterist, I am apt to neglect the "micros," while I am wanting the larger species; but one day last month my little girl detected on a tree trunk in our public garden here a small moth, which, from its great beauty, I was induced to "pillbox." I find it to be *Pseudotomia Tranniana*," pl. 83, fig. 19 (Humphries and Westwood), and therein said to be "very rare." On visiting that tree most mornings since, I have been pretty certain of taking one, sometimes three specimens, and I now muster twelve in series. I thought a notice of its occurrence might interest.—*W. Hambrough.*

P.S. Of course "legs" should have been "wings" of *Colias edusa*, as your correspondent "G. B. C." surmises, in last month's number. I am induced to send you drawings of the wings of two specimens of *C. edusa* which I took in the Isle of Wight last year, differing unusually in the size of the black discoidal spot, as well as in other particulars. No. 1. is a strikingly handsome specimen.

CUCKOO.—Six years ago I took a young cuckoo in a hedge-sparrow's nest, at the same time a nest of young blackbirds, five in number, about three times the size of the young cuckoo. Thinking the blackbirds much crowded in their nest, and plenty of room for one in with the cuckoo, I placed one in the nest with him. He appeared very uneasy, and instantly commenced shuffling in a backward direction to the blackbird, until he got quite under the blackbird, and by a sudden jerk threw the bird over the nest. He then did not appear to have any use in his legs; and as I frequently tried the same experiment to show any friend who came in to see it, and he always acted in the same way immediately the bird was placed in the nest, I must conclude the young cuckoo ejects the young hedge-sparrow, if it is able to eject a bird three times its size. I may add, in conclusion, the young cuckoo never had the use of its legs, as it remained six weeks in the nest, and then died. It appeared to support itself on the knee-joint, and moved its body from the thigh-joint only.—*George Gray.*

CEYLON SPIDERS.—I have recently received some curious spiders' nests from Ceylon; they are concealed in the bark of the *Hibiscus populneus* so effectually that a minute observation alone leads to the discovery of two trap-doors, with perfect hinges, which admit ingress and egress to the inhabitants. They are lined with some soft white material. They were packed separately in small boxes, each box enclosed in paper and tied round with string, and forwarded by sailing vessel on February 9th, and received by me on May 29th. On opening them I found one nest contained a full-grown spider *alive*, and it is still so (June 13th). Another contained two smaller spiders, both alive when I unpacked the case, but have since died. The third was tenantless. Can you tell me the name of these spiders, and account for their remaining so long alive without any apparent means of sustenance? Neither in Wood's Natural History, nor in any other to which I have yet referred, can I find any account of this curious trap-door spider.—*S. B., Parsons Green.*

SPIDERS' WEBS.—The paper on the alimentary system of the house spider, with which Mr. Ponton has favoured us in the number for last month, seems to call for some observation on my part, directly contravening as it does my assertion in the May number (p. 106), that the web of the house spider is non-viscid. The assumption was made on the authority of Kirby and Spence, who especially mention this web as an example of the non-viscid kind, confirmed by my own observation of the web under a microscopic power giving 50 diameters (the common one-inch power). A further examination with a power of 300 diameters has now convinced me of the curious fact that the extremely fine cross threads are closely set with globules of very minute size, but little larger than the diameter of the thread, and that the web is correctly described as viscid. The correction is welcome for the truth's sake, and the more so because it enables me still to claim the so-called "renal organ" as the source of the viscid fluid. That the globules are knobs of the silk secretion, and therefore of the same consistence as the thread, cannot be so easily admitted. The simple experiments detailed in my first paper, which any one can repeat, demonstrate them to be fluid, and of a saline character. Mr. Ponton's supposition that the threads are homogeneous, and not made up of numerous threadlets, may be as easily tested. If a spider is kept in a box with glass top and sides, it will soon spin a web of some kind; and then, looking through the glass with the microscope at the bases of the threads, at their junction with the glass, it will be seen that they are composed of numerous threadlets, each the issue of a particular spinning tube, which unite to form the threads.—*S. S.*

WEAVER BIRDS.—I have had a pair of "weaver birds" for a few years past, and who are at this moment in beautiful plumage. They have regularly every year built nests from grass supplied them. Last year they built three from the same perch, two of them back to back, but communicating by a side entrance. When finished, they for a few days resort to them, but beyond this they never go near them. I have always been expecting to see eggs, but have been disappointed. Can any of your correspondents tell me what is required to induce the hen bird to sit? Their food is principally canary seed; occasionally some green food, and always a little warm soaked bread in the morning, of which they are very fond. Would separation do any good?—*R. D.*

BOTANY.

Claytonia Perfoliata (p. 140).—In the New Series of the *Phytologist*, and I believe elsewhere, I have seen the *Claytonia* found in Chatsworth Park named *C. alsinoïdes*, not *C. perfoliata*. The former was also recorded from the Wood of Scone, near Perth, by Mr. John Sim. If this be really the one found at Chatsworth, and if it still occur there, I suppose it has as much claim to our notice as *C. perfoliata*. Can any one settle the matter by referring to Chatsworth specimens? I found *C. perfoliata* some years back on a wall by the "Green Man" public-house, at the entrance of Putney Heath.—*B.*

Winter-greens.—Will any reader of Science-Gossip be kind enough to send me *fresh* specimens of *Pyrola media* or *P. secunda*, especially the former? I am anxious to compare them with *P. minor*, and would gladly pay any expense incurred in sending. —*James Britten, High Wycombe.*

"Notes and Queries."—Can you or any of your correspondents tell me in which number of *Notes and Queries* I should find a list of Buckinghamshire plants, collected chiefly in the neighbourhood of Great Marlow? I am informed that such a list was published in *Notes and Queries* some five or six years back, and am anxious to obtain it.—*B.*

Cornish Coast Ferns.—Whilst on a tour last month along the north coast of Cornwall, I saw growing on the upper part of a sea-cave, near the entrance, a fine specimen of the *Osmunda regalis*, together with the *Asplenium marinum*, and *Athyrium filix-fœmina*; and I also saw the same plants in a similar situation a little further on. This was on a very rocky part of the coast called Bedruthen Steps, in Watergate Bay. As this situation is so very unusual for Osmunda, I have thought it might interest some of your readers. The rocks were of a slaty character, containing lead ore.—*George R. Perrin.*

Andromeda Polyfolia.—In a week or so this very beautiful plant will be plentifully in flower on our Cheshire peat-bogs. It is described in the books as flowering in June, which it really does; but, like honeysuckle, it also has two distinct seasons of flowering, and will bloom again freely in August, just about the time that the first crop of fruit is ripening. This is not generally noticed in botanical books. The bunches of flowers are terminal; but as soon as they wither, several young branches shoot out from below the fruit, just as they do in the Rhododendron, and in a month or more these branches are also tipped with the delicate, pale pink blossoms. This year I find that, probably on account of an extremely dry, hot forcing spring which we are having, many plants have, even now, produced one crop of fruit, and are already flowering a second time on the young branches; so that most likely the Andromeda will flower three times this year.—*Robert Holland, June 1st.*

Lemna gibba.—In Science-Gossip for January, 1865, there is an interesting article on *Lemnaceæ*, in which it is stated that the most natural habitat of *Lemna gibba* is the stagnant water of ditches and ponds in a semi-putrid condition, from the presence therein of decayed vegetable and other matter. That the plant exists in such situations I do not doubt, after having read the article in question; but that impure water is at all requisite for its existence I am able to disprove, for I have recently found it flourishing under exactly opposite conditions. Since my reading of the article, I have searched diligently for *L. gibba* in the situations there stated to be favourable to its production, without having once met with it, although this neighbourhood abounds with stagnant ditches and ponds. A few days ago, however, I came upon it growing in great abundance in a large pond, with an area of about 150 square yards, and containing water so transparent that, on pulling aside the dense matting of duckweed with which its surface was entirely covered, the bottom of the pond was clearly visible at a depth of eighteen inches near the edge. With a branch from the hedge I drew out a large piece of the tangled duckweed, and on examining it I found, to my surprise, that it consisted not of *L. minor*, as I had anticipated, but of *L. gibba*, thinly interspersed with *L. trisulca*, *L. polyrrhiza*, and *L. minor*. Observing another pond of nearly equal dimensions about twenty yards distant in an adjoining field, I proceeded thither, and on examining the duckweed with which its surface was partially covered, I found it to consist of *L. minor*, sparsely intermixed with *L. trisulca*, *L. gibba* not being present, although this pond is so close to the other in which it is plentiful, and the water it contained was in an impure state, caused by the plunging of the cattle which I observed were grazing in the field. On pursuing my excursion, I came to another large pond of clear water about a couple of hundred yards distant from the other two, which was also covered with a green mantle, composed of *L. polyrrhiza*, *L. gibba*, and *L. minor*—the first two species preponderating. It is therefore clearly proved to me that impure water is by no means necessary to the existence or propagation of *L. gibba*, as has been stated, and that *L. gibba* is not *L. minor* converted by a fattening process. As the foregoing facts may prove of interest to some of the readers of Science-Gossip, and their insertion in its pages elicit further information on the subject, I have forwarded, for the satisfaction of the Editor, specimens of the three most rare species, all of which were taken from the one pond.—*J. B. Chester.*

Hebony.—Allow me, as a student of Old English, to explain that there is no doubt about the meaning of *hebony* in "Hamlet." The explanation *henbane* is absurd, and was started by some commentator, whom others have followed like a flock of sheep. Even in Mr. Jephson's Glossary to the Globe Shakespeare, we find *hebenon* (for such is the true reading) explained by *henbane*. This is simply wrong; for *hebenon* means *ebony*, as may be shown by very sufficient authorities. The passage was explained long ago in Nares's Glossary, from which I extract the following:—"*Hebenon*, ebony, the juice of which was supposed to be a deadly poison." He cites a very apposite passage from "The Jew of Malta":—

> "In few, the blood of Hydra, Lerne's bane,
> The juice of *hebon*, and Cocytus' breath,
> And all the *poisons* of the Stygian pool."
> *Jew of Malta*, Old Pl., viii., 355.

The same explanation was given by Mr. Douce, and it may be remarked that the old quarto reads *hebona*. Every reader of Spenser must remember the introduction to Book I. of the "Faerie Quene," where Cupid's bow of ebony is specially characterized as being *deadly*,—

> "Lay now thy *deadly heben* bowe apart."

Again, in the same work, we find,

> "A gentle youth, his dearly loved squire,
> His speare of *heben* wood behind him bare,
> Whose *harmful* head, thrice heated in the fire,
> Had riven many a breast with pikehead square."
> *Faerie Quene*, i., 7, 37.

In Jamieson's Scottish Dictionary, we find "Heben, *adj.*, of or belonging to ebony. Hebenus, vel hebenum, an *heben* tree." In the Promptorium Parvulorium, A.D. 1440, we have "Eban, tre. *Ebanus*," meaning that the English word *eban*, denoting a tree, is *Ebanus* in Latin. The history of the word is simply this; that *heben* is the usual old English spelling of *ebon*, the adjective formed from a substantive, which was variously spelt as *eban* or *hebenon*. Of these, *hebenon* is copied from the Latin *hebenum*, for in Latin both the forms, *hebenus* and *hebenum*, were in use. The Greek is *hebenos*, the German *ebenholz*. The wood of the *ebony* tree is black, astringent, and of an acrid, pungent taste, and may easily have been considered as poisonous. Even Milton, who uses the word twice, connects it with things baneful and unholy. Melancholy is supposed in "L'Allegro" to dwell "under *ebon* shades," in some "Stygian cave forlorn, 'mongst horrid shapes and shrieks, and sights unholy." Again, in "Comus," we find that the "mysterious dame Cotytto," who is never invoked "but when the dragon woom of Stygian darkness spets her thickest gloom," rides in a cloudy *ebon* chair. Briefly, your correspondent may rest assured that the explanation *henbane* is merely a stupid guess, and that *ebony* is here meant. Why the juice of the ebony should have been considered poisonous, still admits of further illustration.—*Walter W. Skeat.*

Shakespeare's Plants.—In reference to Mr. Newlyn's remarks on the henbane, I would say that the strongest evidence of its not being the plant alluded to by the poet lies in the fact that the *Hyoscyamus niger* was known in Shakespeare's day by its present English name: witness Jonson's "Masque of Queenes," where the ninth hag says,

> "And I have been plucking (plants among)
> Hemlock, *henbane*, adder's-tongue,
> Nightshade, moone-wort, libbards-bane,
> And twice by the dogs was like to be ta'en."

Therefore it is not probable the immortal Will called it hebony. Mr. Newlyn will find the juice of the henbane can be easily extracted, if he bruises the fresh leaves in a stone mortar. The effects of it when improperly used are delirium, dimness of sight, giddiness, and raving; so far, it accords well with the passage in "Hamlet." Henbane is a valuable medicine in many of the ills flesh is heir to. It is the best narcotic of any, but should always be taken by prescription.—*Helen E. Watney.*

Water Ranunculus.—According to Sowerby's "English Botany," *Ranunculus lenormandi*, London Catalogue (12), has only been reported from a few of the counties, and does not appear to be reported from Warwickshire. I find it growing plentifully at Sutton in two of the streams, whilst *hederaceus* is only sparingly represented. That species occurs abundantly, however, all round our neighbourhood. I enclose specimens of leaves, petals, and corpels; I intended to have sent perfect specimens, but petals, &c., are so fugacious that the specimens I gathered to-day had all shed their petals before I got home. The petals, however, are five-veined, and twice as long as the sepals, and the flowers are about half an inch in diameter. *Ranunculus fluitans* also occurs in very great abundance at Witton in the brook that runs into the lane. And another little rarity, *Manchia erecta*, I find sparingly represented in two localities in Sutton Park—growing, however, in wet sandy places, instead of dry sandy places, as is its usual habit.—*J. Bognall.*

Local Floras.—The last part of the "Natural History Transactions of Northumberland and Durham" contains "a new Flora of Northumberland and Durham," of 316 octavo pages, by George Tate, F.G.S., and John G. Baker, F.L.S. We have also received "The Botany of Worcestershire; or, the Distribution of the Indigenous and Naturalized Plants of that Country," by Edwin Lees, F.L.S., published for the Worcestershire Naturalists' Club. These are two excellent and trustworthy contributions to British botany, and we hope that the example will be followed by other naturalists' clubs in counties which do not already possess a "local flora."

MICROSCOPY.

The Silver Tree.—Readers of Science-Gossip who have tried the experiment suggested by R. H. N. B. will perhaps be glad to know that the Silver Tree is far more beautiful as a microscopic object than the one which was described in the June number. A few drops of a solution of nitrate of silver in water should be placed in a glass cell or upon a hollowed glass slide, and on dropping a small piece of *clean* copper wire into it, a growth of exquisitely beautiful fern-like crystals in burnished silver will immediately commence, starting from the copper and continuing to spread in all directions until the whole of the silver in the solution is deposited in a metallic form. A still better way of exhibiting the experiment is to put some of the solution into a copper cell, such as I am in the habit of using for dry mounting;—the silver ferns will then start simultaneously from all parts of the inner circumference of the cell, and will grow out evenly towards the centre. In examining them, both reflected and transmitted light should be employed; the former diffused through ground or opal glass, and just strong enough to show clearly the outlines of the crystals, the latter as intense as possible, to show the beautiful effects produced by their highly reflective surfaces. Slides so prepared should be placed under the microscope immediately, since the newly-formed compound, nitrate of copper, speedily makes its appearance, and as the water evaporates deposits itself in a crystalline form upon the metallic silver.

The foregoing methods are those which are the most readily adopted; but if, instead of decomposing the solution by the introduction of the copper, a weak galvanic current is employed, the experiment becomes one of greatly increased interest. The solution should in this case be placed either in a glass cell or in a zoophyte-trough, and the ends of two fine platinum wires, carefully insulated from the stage, should be immersed in it. When the other ends of these wires are connected with the poles of the battery, a beautiful growth of fern-like forms in pure silver commences in the fluid upon each wire, and proceeds with a rapidity dependent upon the strength of the current and that of the solution. It is very curious to notice that the ferns proceeding from the two wires are of different species, one sort being identical with those produced by the copper, whilst the others closely resemble in shape those which are precipitated in a solution of lead by a piece of zinc; and when it is remembered that in nature silver is almost always found in combination with lead, this similarity in the form of crystallization seems worthy of remark. If during the formation of the crystals the current is broken, their growth is instantly arrested; and if it be then reversed, the beautiful silver fronds begin at once to *ungrow*; the leaf-like forms which, as you watched them, were so wonderfully put forth from their graceful stems, now mysteriously retire into those stems again; these too, in their turn, likewise disappear until the last vestige is dissolved, when a new growth instantly commences—the different forms this time making their appearance upon the opposite wires. The experiment is one of great beauty, especially as seen by a good light with a low power and a binocular; but it obviously requires some care and much steadiness to perform successfully. A very weak current only is required; indeed, with a 3-inch bichromate battery I find it necessary only to allow the extremities of the plates to touch the exciting fluid, otherwise the water itself is decomposed, and the crystals are detached from the wires by bubbles of the disengaged gases. When thoroughly washed, the crystals of silver may be mounted dry, and if the air is excluded from them, they will retain their brilliancy untarnished for many years. I may also add that in bringing electricity upon the stage of the microscope, two short dipping-tubes, mounted in the same way as the stage forceps, make excellent insulators, and at the same time will hold and maintain the wires in any required position; and a commutator included in the circuit places the current under complete control, and enables the operator to break or reverse it at will.—*R. T. Lewis.*

Chætospira Mulleri.—In Mr. Tatem's drawing of *Chætospira Mülleri* (Science-Gossip, No. 42), I was glad to recognize an infusorian, a solitary specimen of which I met with last summer on the stem of a water-crowfoot from this neighbourhood. At the time, I sent a drawing of it to a friend who had access to a number of books on the Infusoria, requesting him to identify it, but he did not succeed in doing so. I would remark that in this specimen, instead of the internal cellular tissue being broken down to afford it protection, it had built a tube of minute foreign particles, distributed over the surface of an inner and semi-transparent cylindrical tube, which ran for a little distance in the direction of the stem, and then turned almost at right-angles to it. In the respect of its building a tube it would resemble *Chætospira mucicola*, but I am certain that it was *Chætospira Mülleri* from the fact of the spire when protruded making a complete turn. It may have been another species.—*J. J. R., Weston-super-Mare.*

Volvox globator.—In No. 18 (June, 1866), "J. S." speaks of finding that favorite microscopic object Volvox globator on New Wandsworth Common. I have found it this year in considerable numbers—for the first time to my knowledge—in a pond on Clapham Common, between the Windmill Inn and the Cavendish Road.—*M. E. H.*

NOTES AND QUERIES.

Fusus Berniciensis (King).—If Mr. Bell will refer to Jeffrey's "British Conchology," vol. 4, p. 343, he will find Aberdeenshire (Bell-fish, Dawson) recorded as one of the Scotch localities for this beautiful and rare Fusus.—*W. White Walpole, Holmwood, Kingston-on-Thames.*

Vipers.—Perhaps you or some of the readers of Science-Gossip are able to tell me whether there is any foundation for the supposition that the Viper varies in colour according to the soil it inhabits, sex, or age. I do not fancy the *soil* can have anything to do with its colour, as I met with a good-sized red viper (*Pelias berus*, var.), this morning (May 25th) in some cliffs east of this town (Lyme) in a spot not very far from one in which I saw a grey specimen last March. I could give other instances in which two or three varieties have been met with on the same soil. A death from the bite of one of these reptiles occurred in this neighbourhood a few years ago. In this case it was a child of three or four years of age that was bitten. It complained of a pain in its foot, and on the sock being taken off the part appeared swollen. A doctor was sent for, who pronounced it to be a viper's bite. Remedies were applied as soon as possible, but the child died. I am not aware that it was in a debilitated state at the time. The viper seems more common in this locality than the ringed snake, and may be not unfrequently seen in cliffs and commons, basking in the hot sunshine like the one I saw this morning.—*F. J. D. Hinton.*

[We have been long in the habit of regarding all our vipers as of the same species, notwithstanding the variation in colour which does not apparently depend solely upon the soil, sex, or age. Persons practically well acquainted with them still believe that the adder and viper are distinct, and we confess to the weakness of leaning a little in that direction. To say the least, there are very distinct and relatively permanent *varieties* of the viper. Mr. Frank Buckland says that he "cannot make up his mind whether the little red spiteful viper is the young of the common viper."—Ed. S. G.]

Old Saws.—In the "Display of Heraldry," a book published in London in 1679, I find the following interesting pieces of Natural History information regarding the Unicorn, of which "some naturalists have made doubt whether there be any such beast or no, but whose horn (in many places to be seen) is in great esteem," as the book says. It observes: "His vertue is no less famoused than his strength, in that his horn is supposed to be the most powerful antidote against poison: insomuch as the general conceit is, that the wild beasts of the wilderness use not to drink of the pools for fear of venomous serpents there breeding, before the Unicorn hath stirred it with his horn." The Boar, we are informed, "useth often to rub his shoulders and sides against trees, *thereby to harden them against the stroke of his adversary.*" The Lion "when he mindeth to assail his enemy, stirreth up himself by often beating of his back and sides with his tail, and thereby stirreth up his courage to the end he do nothing faintly or cowardly. The Lion when he is hunted, carefully provideth for his safety, labouring to frustrate the pursuit of the hunters by sweeping out his footsteps with his tail as he goeth, that no appearance of his track may be discovered, whereby they may know which way to make after him." . . . "When he hunteth after his prey, he roareth vehemently, whereat the beasts being astonished, do make a stand, while he with his tail maketh a circle about them in the sand, which circle they dare not transgress; which done, out of them he maketh choice of his prey at his pleasure." In a paragraph on Scorpions the writer informs us that "Pierius in his Hieroglyphicks saith, *that if a man stricken with a scorpion sit upon an ass with his face towards the tail of the ass, his pain shall pass out of him into the ass, which shall be tormented for him.*" He then adds, "in my opinion he that will believe this, is the creature that must be ridden in this case; but that the oil of scorpions is a chief cure against their own stinging, is an ancient observation."—*H. E. C.*

Spider Poison.—With reference to Mr. Graham Ponton's assertion that no English spider is capable of inflicting a bite sufficiently hard even to pierce the human skin, I beg to inform you that some nine months ago, while moving some old boxes, I suddenly felt a sharp nip in the hand, between the forefinger and thumb, and to my surprise I found a large spider fastened on my hands, which at first I could not brush off, as his fangs were fastened in the skin. After brushing him off and killing him, I found two small holes, about $\frac{1}{24}$ of an inch apart, filled with blood. There was a tingling sensation in the part for eighteen hours afterwards, with a tenderness that was surprising from so slight a wound, and was probably caused by the poison fangs, both of which entered my hand.—*F. R. M.*

Scale Insects (Cocci).—My greenhouse is infested with the above-named insects, which are making sad havoc with my plants, especially the Oleanders. As I have already tried several recipes for destroying insects, all of which have failed, and am anxious to avoid introducing this pest into my new conservatory, I shall feel very grateful to any reader of Science-Gossip who will inform me (in an early number) of some sure method of effecting my object without injuring the plants.—*L. V. H.*

A Punch for Aunt Judy.—If C. D., who wrote the article called "Cuckoo Flowers" in *Aunt Judy's Magazine* for May, designs to compile other similar papers from our journal, we would suggest that in taking from B. the said C. D. place only the quotient to his or her own account, and give us credit for the rest. The latter part of "Cuckoo Flowers" − b would have been = x (an unknown quantity).

Gold Fish Hatching.—A pair of gold fish were placed in an aquarium (a horticultural propagating glass), about eighteen months ago, and have since been well cared for by having regular supplies of food,—the introduction of aquatic plants, and partial changes of the water whenever it became decidedly discoloured (green). On the 1st inst. it was observed that one of the fish was spawning; both fish were immediately removed to another aquarium, and the original one, with the spawn, undisturbed, exposed more fully to the sun's influence. Yesterday, on the tenth day, two young gold fish were seen swimming about very lively and active, thus demonstrating the interesting facts. This fish culture may be carried on within marvellously narrow limits, and the hatching process with the gold fish occupies a period of about nine days.—*W. O.*

Hybernation of the Natterjack.—Is not this a singular instance of what was certainly *not* hybernation?—though I am not Latin scholar enough to know what name to give to the winter sleep taken in summer. One of my little daughters has a pet Natterjack. It was brought to her about a year ago, when very young and small, by Mr. King, and was placed in a fern case in my bedroom. She grew so fond of it that she took it about with her in a small case during three months' summer travelling. At the end of October it was replaced in the fern-case, and lived there most merrily all the winter, fed on earthworms, as we could not get flies, and grew very large. At the end of March it disappeared. Yesterday (June 2) thinking it must be dead, we searched for and found it very deep down under the roots of a fern. It woke up, was very lively, took a good bath in a basin of water, and on being replaced in the fern-case, amongst numerous other reptiles, and at least thirty flies, instantly, without honouring any of them with the slightest attention, eagerly scratched itself a hole, and went down, without touching one of the flies buzzing round its nose. Does their nature so require the sleep that if not taken in cold weather it must be in heat like the present?—*L. H. P.*

Dreissena polymorpha.—I am anxious to collect particulars respecting the localities in Great Britain for this bivalve, and would be much obliged if any of your numerous readers would favour me with information on the subject.—*T. G. P., Institution, Park Street, Bristol.*

Query on Mounting.—In reply to J. B., I have not found anything do better to cleanse lenses and slides than soft blotting-paper made into a roll, and enclosed in a case, so as not to be touched by the hand. The glass should be breathed on, and then rubbed with the end of the roll, which should be scraped with a knife after using to renew the face. *Any* cloth used by hand almost directly contracts a greasiness which it communicates to the glass; but if the paper be not used, a small quantity of chalk is preferable to benzole or liquor potassæ.—*E. T. S.*

Parasites.—Towards the end of last month, whilst collecting larvæ, I took some from sallow; they were geometers about three-quarters of an inch in length, but I was unable to identify them. I noticed that they were unusually stout, and was surprised in a day or two by the appearance of one or two objects very like the *Gordiaceæ* in their forms and movements, but of a light greenish-yellow colour. They are not bifid at one extremity. One larva that had died—apparently more from want of food than disease—and had become quite hard, I opened at one extremity, and perceiving one of these worms (I cannot say intestinal, as it occupied the *whole* of the skin), I placed it in some water, and in less than two minutes it had emerged from its covering. Being quite dead, I imagine this movement was caused by the filling out of the tissues by the absorption of the water, and thus pressing upon the sides of the case formed by the skin of the larva obliged its expulsion. The length of this was six inches and a half. From one larva two of these parasites came, one two inches and three-quarters, and the other four inches in length. Whilst alive, the larvæ seemed sluggish in their movements; it is indeed strange that they lived at all having such tenants. One would imagine that the pieces of food swallowed by the caterpillars were two small to contain the ova that produced these worms, and yet I suppose this is the only feasible mode in which to explain their manner of ingress. Perhaps some of your correspondents can throw some light upon the habits of these parasites. —*A. B. F.*

Scarecrows.—Those who complain of the devastations committed by birds on their crops, and who do not wish to kill many of them, have frequently recourse to boys whom they employ to drive them from the field or plantation. While the boys are present they are much more effectual for this than any inanimate scarecrow, but their great expense renders this method objectionable to many persons, who are thus at a loss for some other plan. For a small garden a bladder containing a small quantity of gravel suspended by string between two upright posts, or from a cross bar on a post, may by the rattling sound which the least breath of wind occasions be effectual in some cases. A human figure cut out of tinned iron and painted black, may be hung from this suspended bladder as a valuable adjunct. A small clattering windmill with a rattle attached on a post, answers with some people. Others suspend from a line old clothes stuffed with straw, to represent a human figure. A bladder or circular gourd containing gravel forms the best head in this case, so that the rattle is again combined with the human figure. The clothes if coated with coal tar will last a considerable time. By some persons a whistle ingeniously fixed in a tin funnel on a little revolving windmill is so contrived as to veer and whistle with the wind. A line stretched across the beds from which rags depend is a common scarecrow in use in gardens, and is certainly sometimes successful at least for a time. All inanimate scarecrows lose their effect—familiarity breeding contempt on the part of the birds. Those who use them should not be discouraged by any not answering for long, for at best they require to be frequently varied. Others endeavour to scare birds by means of the repeated discharge of blank cartridge, which is the most effectual but the most expensive process in use. But except under exceptional circumstances we should not attempt to drive away the birds, we want them much oftener than we do not want them; they are our best insect gatherers, having sight and prehensile powers in this respect superior to that of the expensive and inefficient human agent. We feed men to gather caterpillars or slugs from our fields and gardens, why not the birds, if "the labourer is worthy of hire"?—"*Food, &c., of British Birds," by C. O. Groom Napier.*

Dentalium.—I found in a milldam here a species of, I believe, *Dentalium*. As in Catlow's "Popular Conchology" this genus is stated to be "marine," and no "fresh water" species named, I should be much obliged if any of your readers would inform me what species of the genus inhabits fresh water.— *T. R.*

Moth Courtship.—A few days ago, I had a buff Ermine moth (*Arctia lubricipeda*) come out among some other moths in my breeding cage, from last year's stock of chrysalids. Not wanting it, I left it in. Next morning I found four males of the same species in the immediate neighbourhood of the cage. The second morning there were nine more males—some on the cage, all within the space of a yard from the moth inside. I opened the door to examine the moth, and found it was a female. On the third morning there were five others there, making in all

eighteen male moths in the three nights. I took them all away but one, as on former occasions; so I put the female on the garden with the male that was left. The following morning both were gone, and I have not seen any since. Where could these moths have come from? I cannot conceive, never before having caught but one in the garden. How could they know the female was there? The cage stood up in a corner; it has thick canvas sides, so it is comparatively dark inside (this I should say happened in a densely crowded part of Islington). There is no perceptible aroma from the Ermine, as in the *Liparis auriflua*, &c.—*T. E. F.*

SPIDERS.—I see several correspondents speak of the "supposed" poisoning powers of the spider. Could not one who is expert in anatomizing them get a little of the poison on the point of a needle, and try its effect? I see Mr. Ponton speaks of the bite of a spider proving fatal as an unreliable story. All I can say is that at the Cape there is a large spider, which they usually call the Tarantula, of which the natives are somewhat afraid; but I never heard of its doing much damage. I had a boy who was bitten by one so as to make his finger bleed, but no further effect followed, so that in this case the poison was not very strong, and I don't remember hearing of any one being much the worse.—*E. T. S.*

A PLEASANT INCIDENT in the proceedings of the last meeting of the Royal Microscopical Society, on the 10th ult., was the admission as a Fellow of the society of Arthur E. Durham, Esq., president of the Quekett Microscopical Club, during his period of office. The president, Mr. Glaisher, departing from the usual formula, expressed on behalf of the Royal Microscopical Society the sincere pleasure he felt in admitting as a Fellow the president of a society established for the promotion of the same objects and for the study of the same department of science. He regarded Mr. Durham's presentation of himself for election as an indication of good feeling on the part of the Club over which he presided, and as a graceful act which would have the effect of drawing closer together two societies which should be mutually useful to each other. The hearty and prolonged applause and shouts of "Bravo!" which followed, showed how truly the president had explained the feeling of the Fellows present. Mr. Durham warmly reciprocated the compliment paid him, amidst repeated cheers. It is with the greatest gratification that we chronicle this *rapprochement* of the two societies. We trust that the little estrangement from each other which has existed is now at an end, and that the hand-shaking of their two presidents may be taken as a harbinger of their future unity and friendly intercourse.—*Land and Water.*

THE CUCKOO.—Can any reader say, from actual observation, in what way the cuckoo deposits her egg in the nest of the small bird she may select? I have looked into Yarrell, Mudie, Jenyns, and other writers on Ornithology, and all are silent on the subject. In the "Edinburgh Encyclopædia" (article "Ornithology"), I find that "Levaillant mentions that he has seen the female of an African species swallow the egg and retain it in the œsophagus till she dropped it into the nest, and that the same has been observed of the common species." Now it is physically impossible that a bird the size of the cuckoo can accommodate her body to the nest of the hedge-sparrow, wagtail, &c., for the ordinary process of laying. In some instances the nest selected is placed in a situation that the bird could not enter. A relative informs me that last year he saw in the gardens of Seizencote House, Gloucestershire, a wagtail's nest, in which was a young cuckoo, built under a stone shell that formed the basin of a fountain, the shell resting on the gravel path. I think, therefore, that it is probable she carries the egg in the beak or throat until she finds a suitable nest—perhaps directed to it by the call of the foster bird. In the "Edinburgh Encyclopædia" (article "Ornithology"), it is recorded that there have been a few well-authenticated instances of the cuckoo building a nest and breeding in the ordinary manner." "The Hon. Davies Barrington quotes three instances—one occurring in Derbyshire, another within a few miles of London, and the last in Merionethshire." Are there any known recent instances of the kind? The habits of this interesting bird, and the "reason why" she adopts so strange a mode of breeding, require further investigation.—*W. W.*

REPTILES AND FISH REMAINS.—Mr. Barkas directs our attention to his paper at p. 104, and the remarks thereon at p. 142; and from evidence supplied, we are at once led to exonerate him from any intentional desire to suppress Mr. A. Hancock's name. The circular of December 9, 1867, issued by the Tyneside Club, announces one of the papers "by Thomas Atthey." The circular of the same club for April 10, 1868, appears to be the first which announces a conjoint paper by Messrs. Hancock and Atthey, whereas we received Mr. Barkas's communication before the last circular was issued. The *Annals of Natural History* for February last contains one paper entitled "Notes on various species of Ctenodus obtained from the shales of the Northumberland Coalfield, by Thomas Atthey." In the April number appears the paper entitled "Notes on the Remains of some Reptiles and Fishes from the Shales of the Northumberland Coalfield, by Albany Hancock, F.L.S., and Thomas Atthey," which, we presume, was read some time in March, but do not find any record, or that we received a circular. It must therefore have preceded the paper announced on the 10th April. Mr. Barkas disclaims any intention of suppressing Mr. Hancock's name, and we are bound to accept his disclaimer.

DISCOVERY OF A BED OF FOSSIL OYSTERS.—Mr. Whittle, of Chorley, is sinking a new shaft down to the Arley seam of coal, at a spot near to the railway, half way between the Adlington and Horwich stations, on the Lancashire and Yorkshire line, about a couple of miles from the foot of Rivington Pike. Two seams of coal have been passed, and at a depth of 130 yards, the sinkers have cut through a bed of fossil oysters, 2 ft. 4 in. in thickness. How far the bed extends, it is impossible to say. The oysters are petrified into one solid mass as hard as flint. We have seen two blocks of them which have been brought to Preston as great natural curiosities, by Mr. Dewhurst, coal merchant, who went down the shaft on Thursday, accompanied by Mr. Brindle, flag merchant. The oysters are all perfect in form, and small in size—rather less, perhaps than the London "natives."—*Preston Herald*, May 23, 1868.

STORM GLASS, p. 143, for 272 *Drachms* read *Grains*. The original error (p. 117) is obvious, and should have been corrected by the person who made it. —*T. H.*

NOTICES TO CORRESPONDENTS.

ALL communications relative to advertisements, post-office orders, and orders for the supply of this Journal should be addressed to the PUBLISHER. All contributions, books, and pamphlets for the EDITOR should be sent to 192, Piccadilly, London, W. To avoid disappointment, contributions should not be received later than the 15th of each month. *No notice whatever can be taken of communications which do not contain the name and address of the writer*, not necessarily for publication, if desired to be withheld. We do not undertake to answer any queries not specially connected with Natural History, in accordance with our acceptance of that term; nor can we answer queries which might be solved by the correspondent by an appeal to any elementary book on the subject. We are always prepared to accept queries of a critical nature, and to publish the replies, provided *some* of our readers, besides the querist, are likely to be interested in them. We cannot undertake to return rejected manuscripts unless sufficient stamps are enclosed to cover the return postage. Neither can we promise to refer to or return any manuscript after one month from the date of its receipt. All microscopical drawings intended for publication should have annexed thereto the powers employed, or the extent of enlargement, indicated in diameters (thus: × 320 diameters). Communications intended for publication should be written on one side of the paper only, and all scientific names, and names of places and individuals, hould be as legible as possible. Wherever scientific names or technicalities are employed, it is hoped that the common names will accompany them. Lists or tables are inadmissible under any circumstances. Those of the popular names of British plants and animals are retained and registered for publication when sufficiently complete for that purpose, in whatever form may then be decided upon. ADDRESS No. 192, PICCADILLY, LONDON, W.

F. F.—We have known lizards and frogs supplied regularly with such food to flourish satisfactorily.

H. C. L.—We have had similar examples of the variety *Scalaris* of the common snail (*Helix aspersa*), even more widely separated than yours, communicated to us. It is not common when compared with the numerical strength of the species.

J. W. G.—Why seek such an elaborate origin for the word "scarecrow." Does it not afford its own evidence?

A. S., F. R. P., and W. E. M. should read the notices of Exchanges carefully, and comply with the conditions. We cannot enter upon private correspondence relative to the objects offered, and of which we may be custodian. Should a reply be necessary, it is usual to enclose a stamped envelope.

W. B. L.—The trouble is nothing compared with the expense.

J. L. E.—Small galls produced by an insect on leaves of the hedge maple.

J. C.—Received on the 9th of June, so rotten with being enclosed in an air-tight box that identification was quite impossible.

S. H.—We think that we have done enough for the tadpoles for this season.

C. L.—Common and well-known to vegetable physiologists.

T. P. B.—Our remark on "not seeing good cause to alter our opinion" had reference to the insertion of a list of names.

G. R.—Encourage the little birds, and they will prove the best enemies to your plague of caterpillars.

TROWBRIDGE.—Dipterous larva, of a species of *Tipula*.

C. R. S.—We know of no chemical book "treating largely of Aniline dyes." The *Chemical News* would perhaps give you more complete information.

J. C.—1. *Ceramium diaphanum*. 2. *Desmarestia aculeata*, autumn condition. 3. *Stilophora rhizodes*. Such indifferent specimens are really not worth the trouble of naming.—*W. H. G.*

R. V. T.—1. *Trifolium scabrum*. 2. *Trifolium striatum*.—*B.*

B.—On Sanicula Europæa is *Æcidium saniculæ*.

PRIOR'S POPULAR NAMES OF BRITISH PLANTS. Wanted to purchase a copy.—Address the Editor.

LICHENS.—A student living in Westmoreland would be glad of correspondents in other parts of England, with a view to the interchange of specimens, local, or rarely fruiting. Address, Joseph A. Martindale, Staveley, near Kendal.

C. E. P.—See Exchanges, p. 120.

W. J. F.—Not developed, hence uncertain.

R. S.—The fly rather common about houses just now is *Anthomyia pluvialis* (order Diptera, family Muscidæ), so called because considered indicative of rain.—*F. W.*

W.—The small flies belong to a species of *Encyrtus*, a genus of Chalcididæ, parasitic in the bodies of female Cocci (closely allied to *Encyrtus punctipes*), and the fragile gall-like case mentioned is doubtless the shrivelled body of the female Coccus.—*I. O. W.*

J. F. W.—We are always ready to describe the inventions and improvements of amateurs, but have an objection to the insertion of descriptions of apparatus manufactured by opticians, unless we have seen and consider them of special importance. We cannot insert *all*, hence it would be unfair to those who are excluded.

R. G.—Apparently a linear-leaved *Potamogeton*, but impossible to identify from a leaf or two rolled up and crushed in a letter.

MOSSES.—Answers and names next month.

EXCHANGES.

DIATOMS.—Twelve excellent slides will be given for pure gatherings of *Tryblionella gracilis* and *puncata*, or *Donkinia carinata*.—J. A., 13, Suffolk Square, Cheltenham.

PIKE SCALES, HAIRS FROM LARVÆ OF GOLD-TAILED MOTH (unmounted), or LAND AND FRESH-WATER SHELLS, for mounted objects of interest.—Alfred Taylor, Hezmalhatch Yard, York Street, Leeds.

CAREX.—Twenty-eight species in exchange for seedling exotic ferns. Lists exchanged. H. J. Ryder, 18, Bachelor's Quay, Cork.

NAVICULA.—A slide of Navicula crassinervia, cuspidata, gibberula, Jenneri, Westii, elegans, lyra, quadrata, or humerosa, wanted for other objects. Each slide to be mounted from a pure gathering, or one of the species named must be the prevailing form.—Address the Editor.

FLEAS.—Bat-flea and Mole-flea, male and female, or any of them wanted, mounted or unmounted, in exchange for good objects.—Address the Editor.

FOSSILS.—Twenty-four post-pleiocene Fossils from Maine, U.S., for an equal number of named British Fossils.—E. C. B., care of the Editor.

LAND AND FRESH-WATER SHELLS OF AMERICA.—99 species for British species, or good British Fossils.—E. C. B., care of the Editor.

FRESH-WATER SPONGE.—Both British species wanted for mounted spicules of Indian Sponges.—M. C. C., 2, Junction Villas, Upper Holloway, N.

FOSSILS AND RECENT SHELLS required for about 200 modern foreign and colonial Copper Coins.—X., Post Office, South Shields.

LARVÆ OF SATURNIA PAVONIA, PHRAGMATOBIA FULIGINOSA, and LASIOCAMPA QUERCUS wanted for Birds' Eggs, or Land and Fresh-water Shells.—J. Gledhill, 28, King Cross, Burnley Road, Halifax.

BOOKS RECEIVED.

"First Lessons on Astronomy, in Question and Answer." 7th edition. London: Jackson, Walford, & Hodder.

"Christianity and Modern Progress," by the Rev. Alexander Raleigh, D.D. London: Jackson, Walford, & Hodder.

"The Naturalist's Circular" for June. London: H. Hall.

"Country Life." Nos. 42, 43. London: 10, Bolt Court.

"The Food, Use, and Beauty of British Birds," by Charles Ottley Groom Napier. London: Groombridge & Sons.

"The Botany of Worcestershire," by Edwin Lees, F.L.S., F.G.S., &c. Worcester: Printed for the Worcestershire Naturalists' Club, 1867.

"Polar Magnetism," a paper read before the American Institute by John A. Parker. New York: Wiley & Son.

"On Certain Butterfly Scales characteristic of Sex," by T. W. Wonfor. Reprinted from the *Microscopical Journal*.

"The American Naturalist," June, 1868. Salem: Peabody Academy.

"High Wycombe Natural History Society Annual Report" for 1867-8.

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SPLITS.

IT is an old assertion, and one in the truth of which all naturalists will concur, that there is always something new in the study of Natural History; so old, indeed, and so generally admitted is it, that space would only be wasted in proving its truth. But it may not be amiss, in these days of progress, to draw the attention of the readers of SCIENCE-GOSSIP to an illustration of the fact in connection with our British plants. To a casual observer, it might seem that the botany of so small a country as our own would soon be examined, and become thoroughly known; but so far is this from being the case, that the more a natural science is investigated, the more there seems to find out about it. Not only do we find that new plants are continually "cropping up," and that a year seldom passes without some addition being made to our phanerogamic flora, to say nothing of the more numerous discoveries in cryptogamic botany, but the investigations of our leading botanists, coupled and compared with those of continental authors, lead us to the conclusion that many so-called species are, in reality, composed of two or more perfectly distinct forms, which present sufficiently definite features to merit separate names, and themselves deserve elevation to the rank of species. It is not our intention in this paper to discuss the relative merits of "lumpers and splitters," but we are anxious to draw attention to the fact that even our commonest plants are worthy of attention, and that strict investigation is necessary to determine their various forms, whether we call them varieties, sub-species, or species. One thing is certain, the minute examination which such investigation entails cannot fail to be beneficial in supplying us with additional objects of interest, and in rendering us better acquainted with our common wild flowers.

The examples which we have selected for present consideration are almost exclusively of moderately common plants; so that all may be able to examine and judge for themselves regarding the merits of each case. The recent (sixth) edition of Babington's "Manual of British Botany," as well as the reissue of "English Botany," now publishing, will convince all that, whatever may be the opinions of individuals, the "splitters" are at present the reigning party as far as botany is concerned. We must premise that our remarks do not present very much originality—they are, in a great measure, simplified from the before-mentioned works; also that, as SCIENCE-GOSSIP is not devoted alone to professed botanists, we have purposely dwelt almost entirely upon the obvious and easily-defined characteristics of the plants we mention, advising all who wish to carry out their observations more minutely to refer to one or both of the books named. If, therefore, the less conspicuous distinctions be passed over, or only slightly touched upon, it must not be supposed that their value is under-estimated; but in a popular periodical such minutiæ would be somewhat out of place. Lastly, lest it should be thought that we are arrogating to ourselves a knowledge superior to that of our brethren, we frankly admit that we are quite unable to discriminate between the species of Willow, and confess that *Rubus fruticosus* still holds its place in our mind as the representative of the fruticose *Rubi*.

The number of species into which the "small silver-budded weed," the Water Crowfoot (*Ranunculus aquatilis* of Linnæus), has been divided can scarcely have escaped the notice of any who have looked through a local Flora, or modern work on British Botany. It must be admitted that some of these species are somewhat closely allied, and in an untechnical paper like this, it would be useless to point out the differences, which none but professed

botanists would appreciate. Still, supposing we continue to apply the name *aquatilis* to those species which have both floating and submerged leaves, is there any reason why we should not distinguish as forms, at least, those few which very rarely have floating leaves, and which are sufficiently frequent to be readily examined? The Floating Water Crowfoot (*R. fluitans*), for example, grows only in running water, in this forming an exception to the general rule of Water Crowfoots. In this species the leaves are divided into very long, narrow segments, and flowers are seldom produced save when the plant is out of the current of the stream. Two nearly-allied forms, *R. Drouetii* and *R. trichophyllus*, are confined to ponds and ditches, and a passer-by might not note the difference between them; but when *R. Drouetii* is taken out of the water, the leaves collapse into the form of camel's-hair pencils, whereas if *R. trichophyllus* be similarly treated, the segments remain almost as rigid as when in their "native element." *R. Drouetii*, too, has usually light green leaves, while in *R. trichophyllus* they are very dark, sometimes almost black. Both of these have small flowers; but there is yet another, the Rigid-leaved Water Crowfoot (*R. circinatus*), which has large flowers, and leaves which do not collapse, are round in outline, and have the segments "all placed in one plane"—that is, flat. The Ivy-leaved Crowfoot (*R. hederaceus*), having no divided submerged leaves, is sufficiently distinct to be at once recognized; while the various other forms in which leaves of both kinds appear have been collectively named *R. heterophyllus*, although modern botanists have restricted this name to one form.

If we here abandon our Water Crowfoots, we shall find that our land species have also received a share of attention. We may first notice the Pilewort, or Lesser Celandine (*R. Ficaria*), of which two forms are described in "English Botany." The first, called *divergens*, has the "lobes of the lowest leaves separate at the base; the lowest sheaths narrow." The second, *incumbens*, has the "lobes of the lowest leaves overlapping at the base; lowest sheaths broad, clasping." Mr. Syme speaks of the first of these as "common throughout Britain." Of the second, he states that he has a specimen collected near Edinburgh in 1849. We have this year examined some hundreds of Buckinghamshire specimens, in the hope of discovering this second variety; but we have not found a single exception to the first-named form, so that we may infer that *incumbens* is of rare occurrence. The Wood Crowfoot (*R. auricomus*) formed the subject of a letter by the Rev. Gerard Smith, published in the "Gardener's Chronicle" some three or four years back. He directed attention to the existence of two forms—one with perfect, the other with imperfect, petals. This latter, which he proposed to call *R. inconstans*, is doubtless in most places the commoner form. "*R. auricomus*," he writes, "is earlier, larger, loves more sunny spots, is of a brighter green, and has the petals equal, without a notch. The other form flowers after *R. auricomus*, courts shade, is of a darker green, and has fewer petals, sometimes none; and when showing a corolla, the petals are unequal in size, often notched, and never so full as those of *R. auricomus*." *R. inconstans*, however, has not received further attention, and, indeed, as far as the flowers are concerned, cannot claim to be considered distinct even as a variety; for about Wycombe it is by no means unusual to find a plant bearing one or two perfect flowers, and the remainder defective. Mr. Syme says, "In Scotch specimens I have very seldom found the flowers perfect, but in Kent and Surrey they are generally so." The Upright Meadow Crowfoot (*R. acris*), again, is divided into three forms, two of which are "very common throughout the kingdom." In the first, *R. Steveni*, the stem has "scattered hairs at the base," and the segments, or divisions, of the root-leaves are not overlapping. In the second, *R. vulgatus*, the base of the stem and footstalks are densely clothed with hairs, and the segments of the root-leaves overlap each other. It might, perhaps, be thought that we had now exhausted the "splits" of the *Ranunculaceæ*, but this is by no means the case. We will not stay to consider the forms of the Lesser Meadow Rue, nor the three varieties into which the Common Meadow Rue (*Thalictrum flavum*) is divided; we will pass by two varieties of the Lesser Spearwort (*Ranunculus flammula*), and we have "said our say" about the water-loving species of *Ranunculus*; but we must just stay for a moment to look at the Marsh Marigold (*Caltha palustris*). We may remark, by the way, that in this plant the blossoms do not owe their brilliancy to the petals, for these are altogether wanting, their place being supplied by the usually insignificant, but in this case prominent, sepals. This exception to the general rule may also be observed in other Ranunculaceous plants; as in Traveller's Joy (*Clematis vitalba*), and in various species of *Anemone*. In the usual form of *Caltha palustris* these sepals are large, roundish egg-shaped, and contiguous—that is, touching or overlapping at the edges; but in the form *C. Guerangerii* they are smaller, oblong egg-shaped, and "not contiguous when fully expanded." Mr. Syme says this last "may not be uncommon;" but he has only seen it from two Scotch localities. We believe that we have noticed it on a common near London; at any rate, it should be looked for. We have purposely dwelt upon the order Ranunculaceæ in order that our readers may in some measure realize what has been done in the way of "splitting" for the other orders. We must now, however, pass on more rapidly, selecting one or two of the more conspicuous

examples as they occur to us, and even now leaving some of the present order, as the two species of *Delphinium*, unnoticed.

The long smooth-headed Poppy (*Papaver dubium* of older authors) has lately been shown to be composed of two distinct forms, which may be readily recognized by a very simple test. The first, which is called by some *P. Lamottei*, but usually retains the name of *P. dubium*, has the sap milk-white, not turning yellow on exposure to the air; while in the second, *P. Lecoqii*, the sap becomes dark-yellow when similarly treated. From a note in Gibson's "Flora of Essex," a work in which much useful information upon critical species will be found, it appears that the capsules of *P. Lecoqii* are "long, club-shaped, suddenly narrowing near the base;" in *P. Lamottei* they are shorter, narrowing gradually to the base." Mr. Gibson says that although "the differences between them are slight," they are "apparently constant both in cultivation and in their natural localities," and that the two plants often grow intermixed. Professor Babington, in his "Flora of Cambridgeshire," first described and distinguished the two forms as occurring in England.

Of the order *Cruciferæ*, which furnishes us with many "splits," we will take one common and generally distributed plant, the Hairy Bitter Cress (*Cardamine hirsuta*). The usual form of this is a small annual, with slender, nearly straight stem, and small white flowers having four stamens. This grows usually in dry but sometimes in damp places, and is by no means unfrequent as a weed in gardens. The other form, *C. sylvatica*, is a larger plant, with stouter, wavy, and more leafy stem, and six-stamened flowers. This is said by Professor Babington to be "common, especially in woody places;" we have, however, more usually found it by the sides of streams, where its more luxuriant appearance at once attracts notice. In this, as in several of our "splits," there is a general difference from the normal form, very apparent to those who are acquainted with both, but impossible to define accurately on paper; and in this way, although the distinctions set down may appear slight, their importance is greatly enhanced to those who will examine specimens for themselves. Babington classes *C. sylvatica* as an annual species; in "English Botany" it is said to be biennial or perennial.

Passing on to the Violets (*Violaceæ*), we must devote a short space to the Wood Violet (*Viola sylvatica*), itself, by the way, not very long clearly separated from *V. canina*. This is divided into two forms, which Babington says are probably distinct species. The first of these, *V. Reichenbachiana*, is the rarer of the two, although "it has been found sparingly in most of the districts in which it has been searched for." We have this year found it in Buckinghamshire, after some years' searching; but we must say that the descriptions given in both our works of reference strike us as scarcely as clear as is desirable. Mr. Watson's note in the "Flora of Surrey" best conveys the peculiar features of *V. Reichenbachiana;* he says it is "readily distinguished by its narrower petals of pale purple (fig. 170), with a deeper spot at their base, and more flattened, always purple, spur." These particulars exactly characterize this form; in addition to which, the veins of the lowest petal of *V. Reichenbachiana* are few, and but slightly branched, while in *V. Riviniana* they are numerous, and much branched. *V. Riviniana* is a larger and handsomer plant (fig. 171), with broader and richer flowers: these differ in colour from those of *V. Reichenbachiana*, but not more in reality, one would suppose, than in the estimation of different observers. *V. Riviniana* has, according to Mr. Syme, "pale bluish-purple" petals; but Professor Babington considers them "blue"; while those of *V. Reichenbachiana* are "pale reddish-purple," according to the former, and "lilac" according to the latter! Both forms grow intermixed in the neighbourhood of Wycombe, and both occasionally vary with white flowers; but *V. Reichenbachiana* is here by far the less frequent of the two, as it also is in the neighbourhood of Denham, Bucks, whence we have received specimens. The figure of *V. Reichenbachiana* in "English Botany" strikes us as scarcely satisfactory; the colouring of the petals is not quite correct, and their narrowness is more conspicuous in the plate than in the living specimens which we have examined. Mr. Bentham unites all the forms of *V. sylvatica* and *V. canina* under the name of the latter species. The Pansy of our cornfields is by some divided into two forms: the first, the true *V. tricolor*, with yellow and white petals, more or less shaded with blue, which much exceed the *spreading* sepals; the second, *V. arvensis*, with yellow-white petals, without any tinge of blue, which occasionally equal, but never exceed, the *erect* sepals. Extreme forms, such as those figured in "English Botany," are readily referable to each of these; but intermediate states may frequently be found. Our common cornfield Pansy in the Wycombe district is probably to be referred to *V. tricolor*, as it has the large petals and spreading sepals characteristic of that form; but the blossoms rarely have even a trace of blue in them, and specimens approaching to the figure in "English Botany" are very rare. We suspect this is the form referred to *V. arvensis* by Mr. Watson in the "Flora of Surrey." The two are scarcely distinguishable. The figure of *V. arvensis* in "English Botany" is remarkably good.

The Milkwort which grows among the grass on commons and heaths differs considerably from the large and handsome form which spreads in masses about chalky banks and wood-sides. The former,

known as *P. depressa,* is the commoner species; it has weak prostrate stems, small, frequently opposite leaves, and small flowers. The latter, the true *P. vulgaris,* is a much stouter plant, with ascending stems, larger and longer leaves, and handsomer, more brilliant blossoms. In some places, as on the chalky slopes near Hughenden, its bright pink or blue blossoms contrast beautifully with the orange chaplets of the Horseshoe Vetch (*Hippocrepis comosa*). We have remarked that white-flowered examples, which are common enough in *P. depressa,* are rarely seen in *P. vulgaris.*

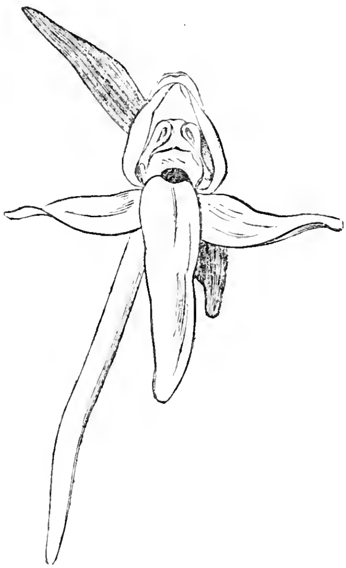

Fig. 166. *Habenaria chlorantha.*

In the Pea and Bean Tribe (*Leguminosæ*), the pretty Restharrow gives us two well-defined forms, neither of them uncommon, although the two are not often found together. The Thornless Restharrow (*Ononis arvensis*) is a soft plant, the leaves and stem being covered with clammy hairs, and the former almost, if not quite, without thorns. In the Thorny Restharrow (*O. campestris*) the stem is very thorny, the leaves and blossoms are smaller, and without the clammy hairs of *O. arvensis. O. arvensis* frequents the borders of fields and hedge-banks, while *O. campestris* prefers dry open places, such as Wandsworth Common, Surrey. Remembering this difference of locality, one might almost be inclined to fancy that these variations might be caused by situation alone, especially as we know that thorns are really only abortive leaf-buds. But the pods of *O. arvensis* fall short of the calyx, while those of *O. campestris* exceed it; so that we may readily discriminate between the two. We have never been able to find the Thorny Restharrow in our Wycombe district, although we have received a specimen from the north of the county but the Thornless Restharrow is very general here, and we have *once* found it with a few weak thorns upon the stem,—very different, however, to those of *O. campestris.* A variety (*parviflorum*) of the Purple Clover (*Trifolium pratense*) may be noticed in dry places; it has stalked flower-heads, and the calyces equal, or exceed, the corolla in length.

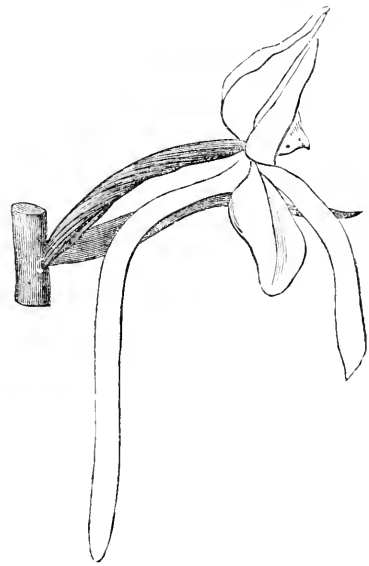

Fig. 167. Side view of flower of *Habenaria chlorantha.*

The Wild Valerian (*Valeriana officinalis*) is divided in Babington's "Manual" into two species, which are said to require more study. The differences between them seem slight: the form retaining the name *V. officinalis* having "suckers, not stoles;"

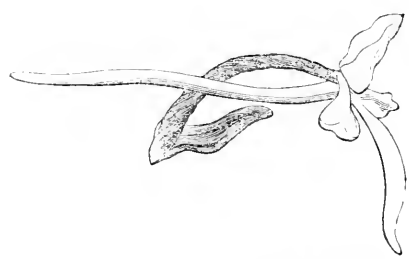

Fig. 168. Side view of flower of *Habenaria bifolia.*

while the second, *V. sambucifolia*, has "long stoles." To understand this distinction, we must remember that a *stole* is defined as "a long trailing shoot from the crown of the root, rooting at intervals," of which we find a good example in the Sweet Violet (*Viola odorata*); while a sucker is "a stem produced at the end of an underground shoot," as in the Great Willow-herb (*Epilobium hirsutum*). Foreign authors lay stress upon the number

of leaflets in the two forms, *V. officinalis* being said to have from seven to ten leaflets, *V. sambucifolia*, four to five; but this number is certainly variable. Under these circumstances, it seems difficult to pronounce with decision upon the subject, but botanists generally seem to consider *V. sambucifolia* our common form. We have this year distinguished *V. officinalis*, with suckers, in one of the chalky lanes near Wycombe. Mr. Watson, in common with many others, does not consider the differences sufficient to constitute a species; and Mr. Syme, in "English Botany," places *V. sambucifolia* as a variety of *V. officinalis*.

Fig. 169. *Habenaria bifolia.*

The Orpine, or Livelong, is the next plant on our list. As *Sedum Telephium*, this plant has been recorded from most parts of England, but it now appears that the rightful owner of that name is by no means generally distributed, its place being supplied by *S. Fabaria*, a nearly-allied species. The chief difference between the two is, in this case, readily discernible. In the true *S. Telephium* the uppermost leaves are "rounded at the base, and sessile;" while in *S. Fabaria* they are "all narrowed to a slight petiole." We have not yet met with *S. Telephium*.

As might be expected, the large order *Compositæ* furnishes us with ample matter for consideration. We will not attempt to investigate the species of *Hieracium* or *Arctium*, because "doctors differ" regarding them, and we have had but little opportunity of examining them for ourselves; but will just glance at one or two examples from other genera. The Goatsbeard, formerly known as *Tragopogon pratensis*, was for a long time the subject of much discussion among botanists; it seems now, however, generally admitted that two species were comprehended under that name. Few can have failed to notice the conspicuous involucre, or whorl of bracts, in which the flowers of the Goatsbeard are usually embedded; and the length of this involucre mainly determines the species to which a specimen belongs. In *Tragopogon minor*, the common form of Goatsbeard, this is about "twice as long as the flowers;" in the true *T. pratensis*, the involucre is shorter than, or only equal to, the flowers. Here, again, is a difference plainly discernible, by which we may examine our specimens: the anthers, which are dark brown in *T. minor*, are in *T. pratensis* yellow. *T. minor* is by far the more common form, and, although we have examined many specimens, we have never yet found *T. pratensis*. Both species are recorded in the Floras of Surrey and Essex, although very few localities are given for it in the former county; in Cambridgeshire, only *T. minor* has been found. Both are said to grow in "meadows and pastures"; but *T. minor*, at any rate, is equally partial to hedge-banks and borders of fields. The Welted Thistle, known indiscriminately to the older botanists as *Carduus crispus*, or *C. acanthoïdes*, is now separated into two forms, each of which takes one of these names. The common form, *C. crispus*, has small clustered heads of flowers, and lanceolate leaves, cottony beneath; while in *C. acanthoïdes* the heads are usually solitary and much larger, and the leaves broader, and not downy beneath. It is "the less common form, and probably a hybrid between *C. nutans* (the Musk Thistle) and *C. crispus*."—*Babington's Manual.*

The Clover Dodder (*Cuscuta Trifolii*), although an introduced species, was first raised to specific honours in this country. It had previously escaped the notice of continental botanists, or had been considered a variety of the Lesser Dodder (*C. epithymum*). The two can scarcely be mistaken; *C. Trifolii* is almost, if not quite, confined to clover-fields, while *C. epithymum* is not rare on heaths, growing on furze, ling, thyme, and other plants. The Clover Dodder has yellowish stems and white flowers; the stems of the Lesser Dodder are red, and the flowers white, with red calyces. The Rev. W. W. Newbould remarks of *C. Trifolii*: "It is most destructive, especially to the second crop of clover, spreading itself in circles, and twining tightly and closely round its victims—in these respects differing from *C. epithymum*, which spreads itself vaguely, and does not kill the plants on which it grows."—*Flora of Essex*, p. 208.

Among the *Labiatæ*, we may notice the Black Horehound, formerly known as *Ballota nigra*. The common coarse-growing form, with dull purple flowers, rough leaves, and an unpleasant odour, which we find on hedge-banks in the neighbourhood of houses, is named *B. fœtida;* but a second species, *B. ruderalis*, is found in Herefordshire, which is "very hairy and soft," and has an agreeable scent. Although stress is chiefly laid upon a difference in the form of the calyx-teeth, we can imagine that the more conspicuous features above noted would more readily arrest attention.

We will just refer to a new species of Bladderwort, perhaps scarcely a "split," as it is possible that a careful examination of specimens of *Utricularia vulgaris* may result in the discovery of this, *U. neglecta*, in other localities. Mr. Newbould remarked, in the "Flora of Essex," that it "should be looked for," and, curiously enough, Essex is the only county from which it is at present recorded.

"Its palate is streaked with numerous anastomosing lines, not a few and simple, as in *U. vulgaris*."—*Flora of Essex*, p. 247. In Babington's "Manual," however, attention is chiefly directed to the upper lip of the corolla, which in *U. vulgaris* about equals, but in *U. neglecta* is nearly three times as long as the palate. *U. neglecta* has bladders on both stem and leaves; in *U. vulgaris*, these are found only on the leaves.

The Blue Pimpernel (*Anagallis cærulea*) has long been a "bone of contention" among botanists, some urging that it is a mere variety of *A. arvensis*, others asserting its claims to be ranked as a species. We rather incline to Mr. Borrer's opinion that, although probably distinct, "each varies with red or blue flowers."—(*Bab. Man.*) We have found *A. cærulea* in two localities near Wycombe for two or three years consecutively; it seems a more wiry plant than *A. arvensis*, with more erect habit. Some correspondence took place on the subject in "Loudon's Magazine of Natural History," Professor Henslow strongly maintaining the specific identity of the two forms, which, indeed, the result of his experiments certainly tended to show.

We will now take an illustration from the *Orchidaceæ*. The Butterfly Orchis, formerly known as *Habenaria bifolia*, is now shown to present two very distinct forms. And here, again, we have a

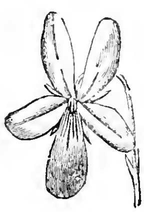

Fig. 170. *Viola Reichenbachiana.*

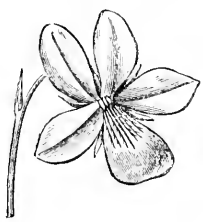

Fig. 171. *Viola Riviniana.*

very good opportunity of noticing that, although the botanical distinction between the two may seem slight, it receives additional importance from the wide difference in appearance which exists between them. If we pluck a flower-spike of the common Butterfly Orchis which grows in woods and bushy places, we shall notice in each flower that the anther-cells are "twice as distant at the base as they are at the top" (figs. 166, 167); this is *H. chlorantha*. We may perhaps find on a common another Butterfly Orchis, bearing a general resemblance to *H. chlorantha*, but altogether smaller; and if we examine a blossom of this, we shall observe that the anther-cells are parallel; this is the true *H. bifolia* (figs. 168, 169). *H. chlorantha* is usually about a foot or a foot and a half high, with broad root-leaves, and a lax spike; *H. bifolia* is shorter, with narrower leaves, and a slender, rather dense, spike of smaller flowers. The latter is only recorded from one locality in Hertfordshire, and we know of but one place in Buckinghamshire where it grows; it appears to be unfrequent in Essex, and in Cambridgeshire is unknown; *H. chlorantha*, on the contrary, if not absolutely common, is at any rate widely distributed throughout these counties. As a general rule, it may be supposed that most of the earlier references to *H. bifolia* should be transferred to *H. chlorantha*.

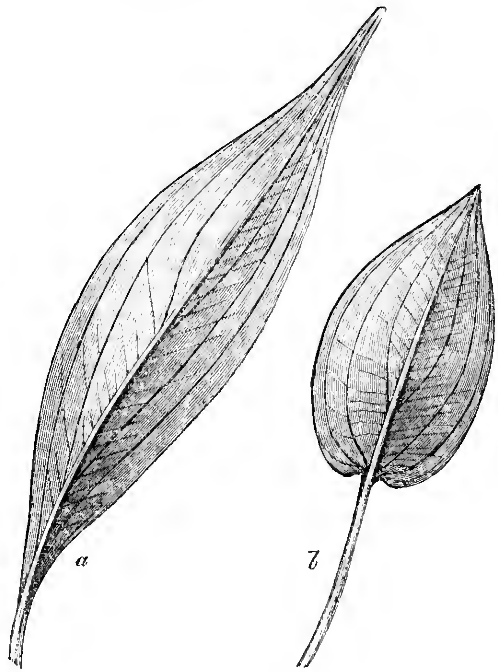

Fig. 172. Leaves of Water Plantain.

Our last example is the Water Plantain (fig. 172). The common form of this, as far as our own observation goes, has lanceolate leaves, gradually narrowed into the footstalk (*a*); and this, although usually recorded as *Alisma Plantago*, is distinguished from that species by the name of *A. lanceolatum*. Withering first applied this latter name to a form "not more than an inch or two in height;" but modern botanists have extended its application. In the true *A. Plantago*, the leaves are shorter, broader (*b*), and "suddenly contracted, or even heart-shaped at the base."—*Flora of Essex*, p. 325. In the work quoted, Mr. Newbould gives several other distinctions between the two, and intimates that *A. lanceolatum* "may be a good species." The two often grow together. The specimens which first arrested our attention, and from which the accompanying drawings are taken, were collected in the Ouse, at Buckingham.

Here then, we leave our "splits." We have not entered upon their merits; they exist, and it rests with our readers to examine and form their own conclusions.

B.

ECHINODERM SPICULES.

ECHINODERMS constitute a class of marine animals known to naturalists by the term *Echinodermata*, which, literally interpreted, means "hedgehog skinned," and some of its members do really bristle with spines, like quills upon "the fretful porcupine." The star-fishes, of which the common "five-fingers" is an example, is an Echinoderm; the sea-urchin, or sea-egg, is an Echinoderm; and the sea-cucumber is an Echinoderm, and so are the disgusting-looking sea-slugs, which are eaten and considered a delicacy by the Chinese. Our epithet of "disgusting" applies to them in the dried, shrivelled, odorous condition in which they appear in the Oriental markets, and now and then in occidental museums. For our present purpose it will serve to regard the class of Echinoderms as made up of sea-urchins, star-fish, and sea-slugs, or, writing more accurately and scientifically, the *Asteroidea* as representing the star-fish, the *Echinoidea*, including the sea-urchins, and the *Holothuroidea*, or sea-slugs, and cucumbers. The *Sipunculoidea* we will leave out of consideration.

It is more especially in illustration of certain microscopical objects derived from Echinoderms that we have entered upon the subject. Every one who has a collection of objects knows that the sections of the spines of the larger urchins are beautiful, and already we have devoted an article to the Purple urchin.* Then the little star-fish are deservedly favourites, and to these we have also directed the attention of our readers, both the "claws of *Ophiocoma rosula*" † and the body of *Ophiocoma neglecta*, ‡ and now it is to the calcareous plates and spicules that we furnish a running commentary, more with the view of directing attention to the subject than by any means exhausting it. It shall be our province rather to suggest than to teach, and to indicate a direction for the researches of any microscopist who may shortly be doomed

Fig. 173. Spicules of *Echinus sphæra*.

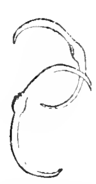

Fig. 174. Spicules from *Mespilia* sp.

to consume a month, and aught besides, at the seaside.

In the last volume of the "Transactions of the Linnean Society" was published a paper by Mr.

* "The Skeleton of the Purple Urchin," by T. G. Ponton, 1867, p. 82.

† SCIENCE-GOSSIP, 1866, p. 202. ‡ Ibid., 1867, p. 219.

Charles Stewart, more especially devoted to the plates and spicules of the Echinoidea, which will well repay a perusal. Whilst the "C"-shaped spicules are common in many urchins, as in our indigenous species, the "common egg-urchin" (*Echinus sphæra*), they occur also in the ambulacral tube of a species of *Mespilia;* then in a species

Fig. 175. Spicules of *Echinus drobrachiensis*.

Fig. 176. Spicules of *Synapta* from Japan.

(*Echinus drobrachiensis* *), found on our northern coasts, another and less regular figure occurs, some-

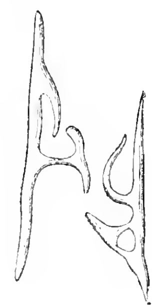

Fig. 177. Spicules of ovary of Echinometra.

Fig. 178. Spicule from mesentery of *Echinometra*.

what like bent thigh-bones; similar, but larger spicules being present in a species of *Synapta* from

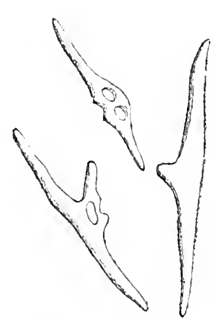

Fig. 179. Spicules from Mesentery of *Cidaris*.

Fig. 180. Spicule of *Cidaris grandis*.

Japan. Still more irregular and indefinable forms occur in the ovary and mesentery of an *Echinometra*,

* *Echinus neglectus* of Forbes.

and in the mesentery of a species of *Cidaris*. "Dumb-bell spicules" have been found in the ambulacral tube of a species of *Echinus* from the New Hebrides,

Fig. 181. Spicules from ambulacral tube of *Echinus* from New Hebrides.

Fig. 182. Spicule of *Diadema* sp.

and T-shaped spicules in the intestines of *Goniocidaris geranoides*. Other forms, approximating

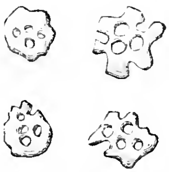

Fig. 183. Spicules of *Cidaris grandis*.

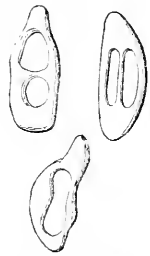

Fig. 184. Spicules from intestine of *Echinometra*.

more to perforated plates, occur in the intestines of a species of *Echinometra* and of *Cidaris grandis*.

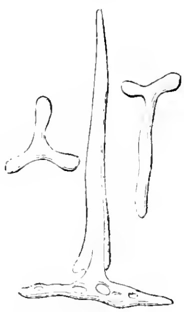

Fig. 185. Spicules of *Goniocidaris geranoides*.

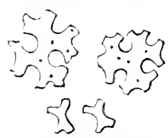

Fig. 186. Spicules of *Synapta bidentata*.

Fig. 187. Plates of Thyone in course of formation.

These figures are evidence, therefore, that spicules of a very singular and interesting form are to be found in the interior of sea-urchins, or those Echinoderms which belong to the order *Echinoidea*.

Fig. 188. Body Plates of *Thyone flexus*.

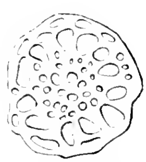

Fig. 189. Plate of Foot from *Thyone flexus*.

More attractive are many of the calcareous forms which occur in the sea-slug order—the *Holothuroidea* and "spicules of a Holothuria" are quite stock objects with the opticians, to say nothing of the anchors and plates of *Synapta* and the wheels of *Chirodota*. We have, as indigenous British species, about a dozen kinds of sea-cucumbers (*Pentacta*), and half a dozen *Holothurias* and *Thyones*, yet, singularly enough, we know nothing of their spicules, excepting only *Thyone flexus*. Here, therefore, is a fair field for work.

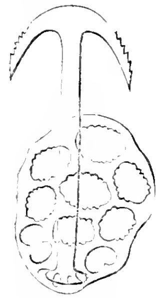

Fig. 190. Anchor and Plate of *Synapta inhærens*.

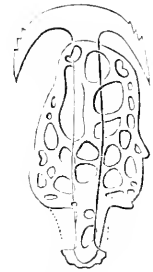

Fig. 191. Anchor and Plate of *Synapta digitata*.

But what of *Synapta?* Dr. M'Intosh found in the Outer Hebrides not only *Synapta Galliennii*, which occurs also at Guernsey, but another species which he calls *Synapta Buskii*, the plates of which

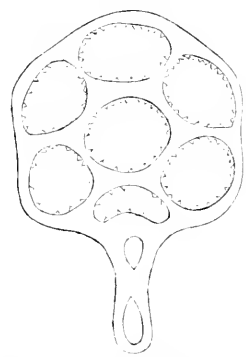

Fig. 192. Plate of *Synapta Buskii*.

have a long handle, and are accompanied by very characteristic anchors. *Synapta digitata* is also British, and many of the slides which are sold are referred to it. As an example of another form of

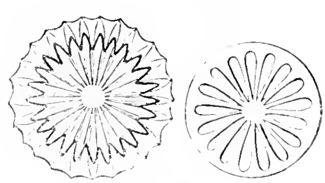

Fig. 193. Wheels of *Myriotrochus Rinkii*.

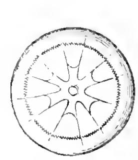

Fig. 194. Wheel of *Chirodota violacea*.

plate which accompany similar anchors, we give a figure of the anchor and plate of *Synapta inhærens*,

which has occurred on the Cornish Coast and elsewhere in the British isles. Most of the slides of anchors mounted in Paris, and sold in this country, are probably derived from *Synapta vittata*, a Red Sea species.

Finally, the wheels of *Chirodota* and of *Myriotrochus*, genera closely allied to *Synapta*, must be adverted to, although foreign to our shores, as examples of beautiful microscopic objects, afforded by the Echinodermata, and if we have done nothing more, we have shown that a great variety of forms, magnificent under the polariscope, are hidden in the uncouth bodies of these but little known " toilers of the sea." M. U. S.

CONCERNING ANTS.

I AM induced by the communication of Mr. Holt in your last number to send you a short account of what I have done, and thus to add my mite to the investigation of one of the most interesting of insects—the ant; and I feel sure that if all who have watched them closely would record what they have noticed, and if all who have the opportunity of watching them will do so, making these pages the medium of publication, a great deal of light may be thrown upon their history and habits.

I had often, as a lad, come across them in the fields, and frequently longed to be the witness of some of their remarkable doings, as chronicled in various books; but, as I never was so favoured, I renounced faith in all the traditions concerning them, save one, and that I believed. I was told that they stored up corn in their underground galleries, and, to prevent it from growing, they bit off the part that germinated. In turning over an occasional ant-hill I saw the ants running off in numbers, most of them bearing aloft in their powerful jaws what I took to be this devitalized corn, but which I have since found were the cocoons containing the next generation of ants.

Last summer I noticed numbers of nests in the garden surrounding the house where I was located: the greater part of them were in the beds and on the lawns, but there were several opening on the edge of the gravel-paths, and here it was much easier to watch them than amongst the roots of the grass. I felt great interest in them, and often when I had time I used to spread a handkerchief upon the path, and, kneeling down close to one of their nests, watch them in their goings-out and comings-in; but the worst of it was that in a very short time the handkerchief began to feel so uncommonly hard and uncomfortable that I had to give it up. It then occurred to me, that some sort of case might be constructed that would contain them, and enable you to observe their movements without having to put yourself in a markedly uncomfortable position, and getting somewhat too freely titillated by the vagrant ants making highway of your individuality.

I resolved to follow out the idea, and so, to begin on a small scale, at first procured a wide-mouthed glass bottle, and covered the bottom for about the depth of three inches with some fine soil well pressed down, and lastly introduced some thirty or forty ants. They seemed at first resolved to have nothing to do with the new arrangement, and crowded to the top of the bottle, over which I had strained a bit of muslin. In a short time, however, they began to descend, and then roamed round the walls of their glass tenement, as if still seeking some aperture of exit. In a little more than an hour I was pleased to observe one digging away vigorously, and by the next morning they had got a gallery driven some distance from the surface, and they were most of them busily engaged in extending it.

Satisfied that the experiment would work, I decided to extend the scale. My next contrivance was to take a glass cylinder open at one end, and about six inches in diameter, this was placed on a circular piece of wood eight inches in diameter, so as to give an inch margin all the way round, this again was supported in the centre of one of the large shallow pans that gardeners use for cuttings and young plants. The pan was then filled with water nearly to the level of the upper surface of the wood, which was to act as a promenade platform or watering-place for the ants. In many respects this plan answered very well, though it had faults which led me to design another; in the first place the wood is liable to warp, being constantly damp, and, again, it is not sufficiently permanent and ornamental to introduce into a room.

My last design carries out the same principle of isolation, and differs but little from an aquarium or fern case, excepting in the base. A glance at fig.195, which represents a formicary in section, will readily explain the arrangement; it is simply the addition of a shallow trough all round the base to contain water, so as to confine the little creatures strictly to their own dominions. Inclosing them on an island in this manner answers much better than having a movable top: with the latter arrangement some are almost sure to escape when it is removed for the purpose of supplying them with food or water. It is much easier and cheaper to construct than an aquarium, as the corner supports may be much lighter, the glass need not be plate, nor need it be fitted into its grooves with that accuracy required for holding water. The trough of course must be waterproof, and may be made so either with pitch, or what I think would be preferable, with thin sheet lead accurately adapted to it.

Having thus got a formicary, the next thing is to furnish it. The soil that I used was very fine and free from stones. I had a few weeds planted in the centre, which I think is advisable, the fibres of the

roots helping to bind the particles together, and preventing the galleries from falling in. At any rate, so far as I know, the nests are found oftener amongst the roots of grass than anywhere else.

All being now ready, we must introduce the ants, and this is by no means the easiest part of the transaction. The best plan I think would be to carry the case and set it down by a nest, taking care that it is properly levelled and the trough filled with water. Then stir up the nest well with a stick, and put down pieces of paper amongst the ruins, these will speedily be covered with insects, and may either be shaken over the case, or popped in just as they are, and removed afterwards when the ants have left them. Care should be taken to secure some of the females, which are nearly as large as wasps, and all the eggs and cocoons that are visible. This being accomplished, and as many as possible secured, it is the better plan to leave it for a time *in statu quo*, for as soon as the ants discover that something has happened they appear to become possessed of a centrifugal tendency and are consequently all to be found upon the platform, running hither and thither, as though wishing to find some means of escape. I am afraid it would be difficult to carry it so steadily as not to cause the water to rush over the platform, sweeping away those who are congregated upon it; and therefore I say it is advisable to wait, for very soon, when they find all retreat is cut off, and no help comes, they will retire into the case and commence to found a new colony: they may then be covered over with a piece of glass or muslin, and conveyed any distance with safety. The last suggestion I will make is, that it is a good plan to make a few depressions in the soil close to the glass, as the ants will then utilize them as the commencement of their shafts, and their operations can thus be watched from the outside much better than if they were sunk at some distance from it.

When the idea first occurred to me last year, and I saw a feasible way of making these cases, I believed they might as justly be called Wardian cases as those containing ferns, but I have since found that I was not the originator of the idea, and that the naturalist, Huber, contrived some means of isolating these insects by means of water; but as to the details of his method I know nothing.

I shall, however, be amply repaid, if the directions I have given should lead any reader of Science-Gossip to construct such an apparatus, and I am quite sure that he would be more than repaid for his trouble and expense, by the instruction and information he would gain, not to speak of the amusement it would afford him.

And now, let me briefly state what I noticed during the short time I had them under observation last autumn. Of course I did not expect to be the witness of any of those wonderful performances that may be seen in the ant-hills of a hotter clime,—they have the great advantage of being "a long way off:" I did, however, expect to find a little more method, and a little more system in their operations. I will admit that I may have failed rightly to interpret their actions, but I think any one closely watching our English ants will agree in the main with me, that great as the amount of work is which they perform, it is nevertheless not done in the most workmanlike manner. They appear to be passionately fond of work, and to make the most of what they can get. Mine seemed to me to work incessantly, night and day, light or dark,—at any rate, more than once I have turned up the gas suddenly about 2 a.m., and found them at it the same as ever. In excavating their galleries I have frequently noticed an ant come out with a piece of dirt in its forceps, and run about apparently in a state of distraction, as if it did not know what to do with it, or else was parading itself as a pattern of industry for other ants; and, indeed, the bigger the burden the more reluctant it seemed to part with it,—perhaps it might look upon it in the light of a nugget,—and when at last it had put it down, it appeared to caress it with

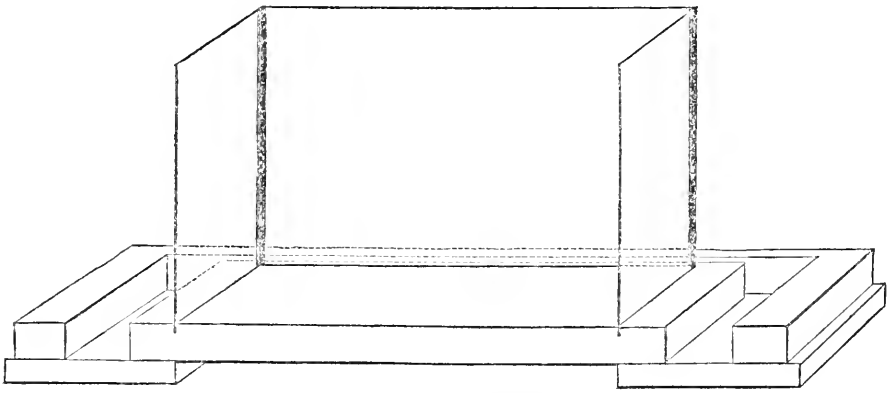

Fig. 195. The Formicary.

its antennæ, as though to make it quite comfortable before leaving it. I have often seen two ants tugging at the same piece in opposite directions, and alternately dragging each other about; and a little stone or bit of stick dragged backwards and forwards in their galleries, first by one ant and then another, before it was brought to the surface. Again they seem to work quite indiscriminately anywhere. One comes out of a gallery with something in its mouth, runs about with it, puts it down, and seems to have lost itself, then finally disappears down another hole. I have seen them go on excavating at the end of a gallery, not carrying out all the débris, but depositing it a little way behind till they were nearly or quite blocked in, or till the passage had become so narrowed that there was only room for one to pass.

When I commenced keeping them I was at a loss to know what to feed them with; I tried them with dead flies, spiders, bits of meat, bread crumbs, and other things, but they did not appear to eat anything, and numbers of them died. It was amusing, though at the same time somewhat painful, to see their dead bodies brought out of the works, and laid down at the greatest distance from the entrance. They were all taken to the same spot: no amount of regret seemed to be manifested, they were simply borne along in the jaws of a fellow worker that had somewhere stumbled over the corpse, and deposited in a pile with the corpses of those that had gone before. So they remained for two or three days, but one morning, when I paid my first visit, I was surprised to find that the *bodies* had also departed—all had vanished. On looking round more closely I found there were a few on the platform, but most at the bottom of the water. I took some of them up and restored them to their former position, and in a very short time they were again seized, dragged up the inside of the glass with great difficulty, then down the outside, across the platform to the verge overhanging the water, and then the ant committed the body of its brother ant to the deep, and went and resumed its work. I tried this several times, each with the same result, and it seems to me to afford good evidence of their possessing a certain intelligence or reason; as, finding the dead bodies were likely to prove a nuisance so near their habitation, they removed them at once to the farthest distance and sank them in the water.

I have read somewhere that ants from the same nest recognize each other after having been long separated. So far as the experiments which I have made go, they tend to contradict such a statement. Some little time after my family had got established in their new quarters, I introduced two from the original nest; they were instantly recognised as strangers, hunted and driven about, and every ant that came near them endeavoured to capture them. One of them I saw killed by a party of four or five, and the other, I have no doubt, shared the same fate, though it escaped for a time by hiding over the platform close to the water. Several times I introduced ants from the same nest, and the same excitement and hunting about was always produced, but I was only once witness to a death.

This species of ant was, I believe, the *Formica fuliginosa*, but am not quite certain; there was also another kind in the same garden, a red ant, probably *Formica rufa*, and one day I put half a dozen of the latter in amongst the former, and the battle that ensued was of the most ferocious character. Their presence seemed to be recognised immediately, or the news of their intrusion must have spread like wildfire, and the proper inhabitants came swarming out of their holes and rushed about in the most rapid and excited manner. They seized immediately, or endeavoured to seize, any of the intruders coming across their path. I remember five between them had taken captive a red ant, one holding on to one of its antennæ, and the other four each to a leg; they were tugging and pulling in opposite and equidistant directions, so that if a line had been drawn from one to another, and so on to the next, it would have described a tolerably correct pentagon, and thus it furnished a fairly good example of the equilibrium of forces, for the unfortunate centre of this combination remained at rest, if rest it might by a stretch of the imagination be called. Of course the red ants had no chance against such numbers, and in the course of the day they were all done to death, some of their bodies being cut into pieces.

Their power of endurance is something remarkable; they may indeed be said to endure manfully as good soldiers. I noticed one of my tenants that had fixed itself to one of the posterior legs of a red ant that got dragged in the struggle into a drop of water that was splashed on to the platform, and it soon became exhausted. It had not power to take a step, and all its legs seemed useless, but it still held on, and was carried about by its victor companions in their attempts to destroy the intruder. After the affray was ended I took it up and dried it, and placed it on the soil inside the case, when it very soon recovered.

The neuters or wingless ants seemed to take great care generally of the males and females, but not always. I have frequently seen them seize the males and carry them underground when a nest has been disturbed, just in the same way that they carry off the cocoons, but I have also seen them attack the females, and one that had been in the nest only a short time, I found one morning divided into three parts, head, thorax, and abdomen being quite separated. That the female ant after a time divests herself of her wings is a curious fact, and one I have several times seen, but I cannot understand how in any similar way she could resolve herself into the three component parts as stated.

There is another proceeding on the part of the neuters that is well worth watching, and that is their opening the cocoons when the young ant is matured. I have seen one of them running round and round and over a cocoon, and then nibbling away at one end till an aperture was made, and the juvenile creature made its appearance. These at first are quite white, and run about in a lively manner; they soon, however, become of a darker hue, and then set to work in good earnest. The eggs, as they are laid in little bunches by the queen or female ant, are carried off by the neuters and carefully looked after; indeed, their solicitude on behalf of them is extreme. I used to get a bit of fine wire, and insert it into the gallery where I could see some eggs stored up, and then watch the consternation that was produced. The eggs, however, were very soon all carried off to a more secret and secluded spot.

I used to put a little knob of loaf sugar in occasionally, moistening it with a few drops of water, and this they seemed thoroughly to enjoy, for it was almost immediately covered by them, each one plying its mandibles, and keeping its antennæ constantly vibrating.

The ants that I kept were quite harmless; but sometimes when watching them in the garden at somewhat close quarters, with a good many running over me, I have felt a slight nip where the skin is very thin, as on the back of the hand, but it is only momentary. The *Formica rufa*, I believe, is the only species in England possessed of a veritable sting; but I have never been stung by one of these as yet.

This insect, too, presents many points full of interest to the microscopist: the antennæ, the structure of the mouth, the formidable forceps it possesses, and the curious comb-like process attached to the tibiæ, not unlike the toothed claw of the spider,—each and all will well repay any one for a careful examination.

I will only add, that if any of your readers in trying the same experiment meet with any difficulty, I should be happy to hear from them; at the same time I can assure them that the whole affair is so easy as to render failure almost impossible.

Frederic H. Ward.

Springfield House, near Tooting.

VIPERS.

In April last the gardener at Rosemerryn (about three miles from Falmouth) mounted on a ladder to prune the creepers on the front wall of the house, and whilst intent on their flowers and leaves was surprised by the fall of a viper on his hat, and thence to the ground, after he had stamped on it with his foot whilst it was hanging on a stave of the ladder. The creepers did not reach to within six feet of the widely-projecting eaves of the roof. It is possible that the viper, in a search after unfledged sparrows, may have crept up through the ivy on the side wall of the house; but even there it would have had a difficulty in reaching the slated roof; but it may have crept along a little ledge on the margin of the eaves. It is not easy to account for his having chosen to avail himself of the gardener's head and ladder for his descent. The viper, which I have seen, was a large male.

With respect to the effects of vipers' poison, I was acquainted with a mason who had been crippled for life by the bite of one. About two years ago a little girl of eight years, whilst gathering flowers in a wood near Liskeard, was bitten by a viper, and died in consequence, as I have been informed. Some years ago one entered a cottage in my plantation, and attempted to swarm up a leg of the kitchen table. The children retreated to an inner room; the viper sought a hole in the wall of the large chimney-corner, after biting the little dog in the house, which died of the wound. On the following morning a mason was sent for to dig out the intruder.

A late servant of mine often took up vipers from the ground and allowed them to creep through his hands; but on one occasion he was bitten before he had touched the animal. He sucked the wound; I then enlarged it and poured in a caustic alkali. The arm swelled and became discoloured, but the effects of the poison were not perceptible after a few days. I have known as many as four young green lizards (*Lacerta viridis*), which I had acclimatized, drop out of the mouth of a viper when held up by the tail. It reminds one of the received opinion among husbandmen that young vipers find a refuge in their mother's mouth.

A young lady, seeing a viper in one of my garden walks, threw a stone at it, which completely cut it into two parts at about one-third of its length from the tail. The head and longer portion turned abruptly from the walk through the grass down a steep bank. The tail followed at a distance of about nine inches, with various contortions, as if the nervous ganglions of the extremity had received the impulse of the animal's volition at the moment of its determining to escape.

There is a cottage in the parish of St. Cleer from which successive families have been driven by vipers, which were sometimes found in their beds: a high bank of loose rubbish abutting against one of the walls seems to have been the haunt of these reptiles.

A French gentleman whom I lately met in North Africa told me that the negroes in Brazil, where he had passed eleven years, rubbed their legs with cut bulbs of garlic as a sufficient protection from venomous serpents, which, they asserted, always turned away on perceiving its odour. One would

like to ascertain if our English viper would shrink from an object smelling strongly of this root. My impression is that red vipers are not a distinct variety, but are young ones retaining this colour until changing their skins in a succeeding spring. I have not seen any young vipers that were not red.

Trebah, near Falmouth. C. F.

THE WAXWING.

(*Ampelis garrulus.*)

THE genus *Ampelis* is represented by three species, viz., *Ampelis garrulus*, of Europe and North America; *Ampelis cedrorum*, peculiar to the latter continent; and *Ampelis phœnicopterus*, of Japan. Of these the first two only possess those curious appendages which have gained for them the familiar appellation by which they are so universally known.

The species which we are about to consider is a winter visitant to this country, and hardly a year passes without a catalogue of its slaughter appearing in print. A British-killed specimen of the Waxwing is always regarded with great veneration by the collector, although, from the frequency of its occurrence of late years, it is not nearly so rare, and is now to be met with in most ornithological collections. But its egg and its mode of nidification were unknown until they were brought to light by the late Mr. John Wolley, who has been the discoverer of so many of the breeding-places of our British birds. No essay on the present species would be complete without a reference to Professor Newton's paper on this subject,* and although it is too long to admit of its entire insertion, I shall make no apology for the following extracts.

The following is from one of Mr. Wolley's letters, dated "Muoniovara, 14th Sept., 1856," and is thus given by the above-named author in the course of his essay, and will always be commemorated as the first authentic account of the Waxwing's nest:—

"I have still to tell you of Ludwig's expedition with Piko Heiki to Sardio, on the Kittila River. It was early in June, and he had to wade over Pallastunturi up to his middle in snow. Arrived at Sardio, he found the lads there all at home, deep in dirt and laziness. He soon extracted from them the information that a pair of birds had been seen about which they took to be *Tuka rastas*, and Ludwig himself had seen such a bird, and this bird's egg was entered in my list. . . . Ludwig immediately started off into the forest, and sure enough he saw a bird which he thought was *Sidens-vans*, but he was not quite sure, for the end of its tail looked white in the sun, instead of yellow as in your

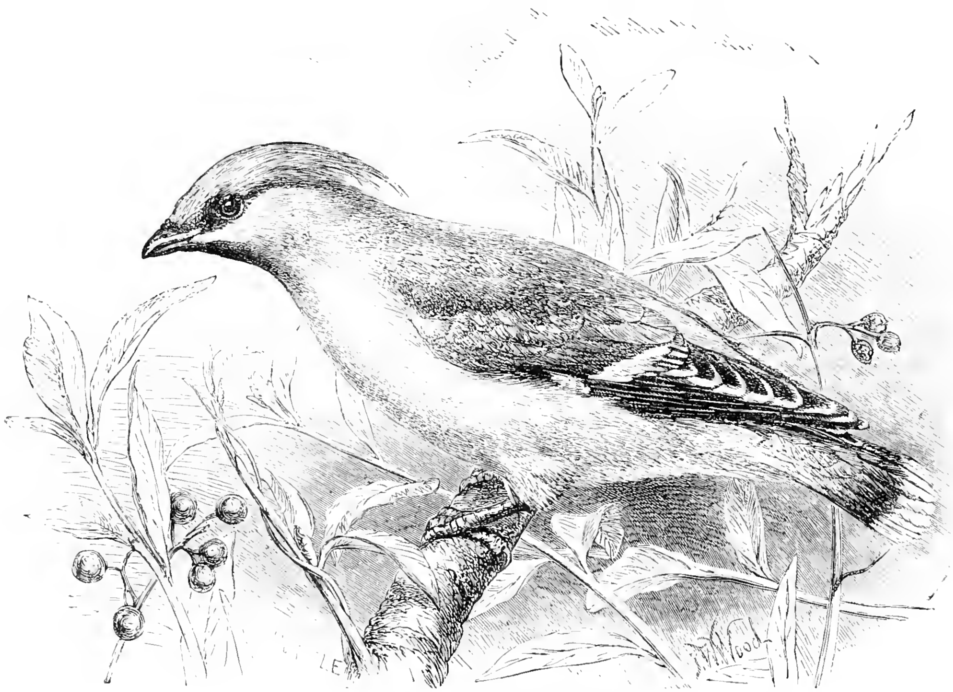

Fig. 196. The Waxwing.

* *Ibis*, 1861, p. 92.

picture;* but the next day, or in the evening, it was cloudy, and Ludwig saw the yellow, and now he had no longer any doubt. He said he would give all the lads day-money, and they must all search, even if it were for a week, till they found the nest. They sought all that night, and the next day till about midday, when a lad called out that he had found the nest; and there it was, with two eggs, about nine feet high, on the branch of a spruce. . . After five days, Ludwig snared the old bird, a beautiful cock; and you may fancy with what pleasure I took it in my hand, and saw there were no doubts remaining. . . . You may fancy how eagerly I waited for Ludwig to produce the eggs. With a trembling hand he brought them out—but first the nest, beautifully preserved. It is made principally of black tree-hair (lichen), with dried spruce twigs outside, partially lined with a little sheep's-grass and one or two feathers: a large, deep nest."

Space will not allow me to insert more of Mr. Wolley's remarks, and I therefore extract a few more notes of Professor Newton's on this interesting subject.

"In all, Mr. Wolley obtained twenty-nine eggs of the Waxwing in 1856. . . . In 1857 it seems that the Waxwing was still more rarely distributed in Lapland than it had been the preceding year. . . The summer of 1858, when Mr. Wolley was with me in Iceland, was 'a great year for Waxwings.' Not far from a hundred and fifty nests were found by persons in his employment in Lapland, and some of them close to Muoniovara. It seems, as nearly as I have been able to ascertain, that no less than six hundred and sixty-six eggs were collected, and more than twenty more were obtained by Herr Keitel, of Berlin, who happened—without, I believe, any expectation of the luck that was in store for him—to be that year on the Muonio river. . . It is unnecessary for me to go into details respecting the magnificent series of eggs which Mr. Wolley was thus enabled to add to his cabinet. The nests were built mostly in spruce and Scotch-fir trees (*Pinus abies* and *Pinus sylvestris*)—chiefly, I think, the former. The usual complement of eggs is certainly five, but six not uncommonly, and seven and four occasionally were found. The second week of June seems to be the general time for the birds to have eggs, but there are some which must have been laid in the last days of May, and others (perhaps second broods) a month later."

For an account of the finding of the Waxwing's nest by Mr. H. E. Dresser, I must also refer my readers to Professor Newton's paper, or perhaps more particularly to Mr. Gould's "Birds of Great Britain," where a beautiful coloured plate of the old birds, with the nest and young ones collected by Mr. Dresser, are given.

* This picture was one of several coloured sketches of different birds sent to Mr. Wolley by Mr. Hewitson and myself, to assist him in making known his wants to the natives. —A. N.

I was very much interested on learning from my friend Mr. J. G. Keulemans, of Leyden, that last year (1867) the Waxwings were very numerous in Holland, and that he took a nest himself with four eggs, which is still in his possession. He put an end to all doubt as to its identity by shooting the old female.

Mr. Gould says (*l.c.*), "The food of the Waxwing is of a mixed character, for doubtless in summer it mainly subsists on insects, while in winter it feeds upon berries of various kinds, particularly those of the hawthorn, the mountain-ash, the holly, and the ivy; and from the numbers of this bird which occasionally visit this country and Central Europe, sometimes in flocks of twenties, fifties, or hundreds, the supply will scarcely be equal to the demand."

The following list of localities where the Waxwing has been obtained or observed will give a very fair idea of its geographical distribution:—

North America (Baird, Cassin, Lawrence, &c.); Ireland (Thompson); Great Britain (Gould, &c.); Scandinavia (Nillson, Wolley, &c.); Denmark (Kjærbölling); Holland (Keulemans); France (Jaubert); Tuscany (Savi); Germany (Fritch, Naumann, &c.); S. Russia (Demidoff); Mosul (Moeschler); N. Siberia (Middendorf); Japan (Siebold, &c.), N. China (Swinhoe).

The Waxwing is spread over the northern portion of North America, the most southern locality of that continent from which it has yet been recorded being Fort Riley. Captain Blakiston, in his article on the Birds of the Interior of British North America,* makes the following remark: "The European Waxwing was obtained by both Mr. Drummond and Sir John Richardson, as recorded in the 'Fauna Bor. Am.' in the Mackenzie river district, and specimens and eggs have since been collected in that locality by Mr. Bernard Ross and Mr. R. Kennicott. A specimen was shot in February, which stamps it as a much more northern bird than the following species (*Ampelis cedrorum*)."

In conclusion, I may add that the locality Mosul is inserted on the faith of a pair of birds collected by F. Moeschler, which I purchased along with a Nutcracker (*N. caryocatactes*), all labelled by him as coming from that place.

R. B. Sharpe.

Salmon-breeding.—Mr. Tegetmeier recently called the attention of the Zoological Society to the great progress made in salmon-breeding in the ponds of Stormontfield, on the Tay, which he attributed principally to the young fishes having been fed on a species of *Limnæa*.

* *Ibis*, 1863, p. 65.

ON THE FORMATION OF FERN SEEDS.

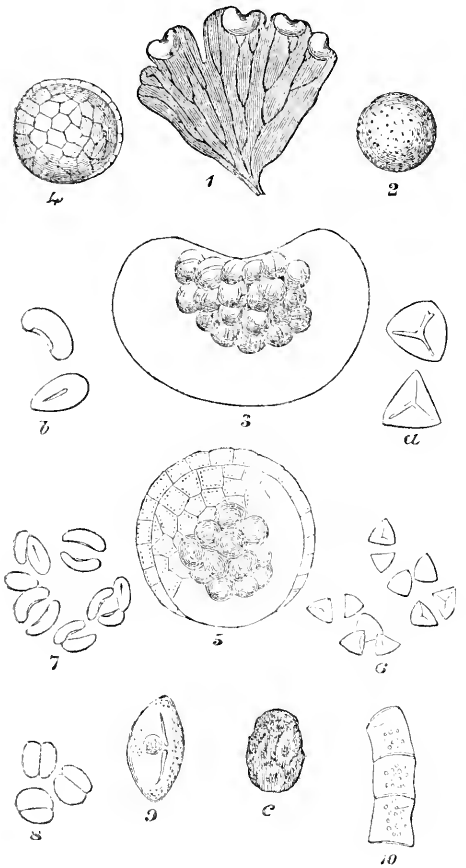

Fig. 197. Fern Spores.

THE seeds or spores of ferns are contained in little vessels named *thecæ*, which are generally gathered together in clusters named *sori* (fig. 3), and most commonly covered with a thin transparent covering termed the *indusium*, which is formed of a single layer of cells. In the Maiden-hair, *Adiantum capillus veneris* (which I have chiefly studied on account of the transparency of its fronds), the indusium is formed by the out-growth and overlapping of the edge of the pinnule (fig. 1). Soon after the indusium begins to be formed, the thecæ appear between it and the leaf as small green cells full of granular matter (fig. 2). In a little while these develop a cellular covering (fig. 4), and a peculiar disposition of cells, which afterwards form the spring by which the spores are eventually liberated from the thecæ.

As the thecæ advance towards maturity, there appear within them small round cells (fig. 5) developed from the granular matter; these by subsequent cell-division become the spores. In their early stage the spores are transparent, but afterwards become opaque and dark coloured. The young spores of the Maiden-hair are represented at fig. 6; of the Oak Fern, *Polypodium dryopteris*, at fig. 7; and of the narrow Prickly Fern, *Polystichum lobatum*, at fig. 8, in which the formation of the spore from the division of the round cell is very evident.

The young spore of the Male Fern (fig. 9) displays a nucleus; this I have not observed in the spores of other ferns; *c* is the ripened spore. A band of cells nearly surrounding the thecæ forms a kind of spring, the growth of which seems to be thus:—The adjacent cell-walls are at first partially absorbed, so that the whole spring becomes one cell, and in this stage contains starch granules (fig. 10). Then the rings which remain at the junction of the cells are strengthened on three sides with secondary deposit; and become like arches sustaining the outer cell-wall, which seems gradually to dry in and produce a tension of the whole. As the spores ripen, the sides of the thecæ become thinner and weaker, until the tension of the spring overcomes their resistance, and scatters the spores on every side.

J. S. TUTE.

A CENTURY AGO.

UNDER this title a correspondent gave us last year (see p. 127 of SCIENCE-GOSSIP for 1867) some interesting extracts from a work on natural history published in 1763. Just before reading these I had, curiously enough, accidentally met with an old book, forming vol. v. of a larger work, on the "Natural History of Waters, Earths, Stones, Fossils, and Minerals, with their Virtues, Properties, and Medicinal Uses," &c., by R. Brookes, M.D. This, too, was printed in 1763, and at the Bible and Sun, though this office is therein stated to be in St. Paul's Churchyard, and it was printed for J. Newbery, not for C. and R. Ware. I thought at first it might possibly be a portion of the same work from which Mr. Allen quoted; but, however, that is of no consequence. The statements put forward in it are, perhaps, not so absurd as those he produced, but they are certainly interesting. My book commences with a full and particular account of the various medicinal waters of England, their properties, and the doses prescribed for different complaints. These said doses are somewhat alarming to us of the present day, especially if we believe in homœopathy, a quart or two being considered a very moderate quantity. The *Dulwich Water*, which "has a brackish taste, with a little bitterness in the throat," cures several ailments, if taken in a dose of three pints a day *at first;* but this "should be increased every day, till it comes to eight or nine pints"!

"At Ancliff, a village three miles from Wigan, there is a spring called the Burning Well, which

will take fire by holding a lighted candle near it. It will continue a whole day, and eggs and flesh may be boiled therein; but the water itself is cold. It is but a few yards distant from a rich coal-mine, which renders it probable that the inflammable vapour is rock-oil."

The composition of this short pithy paragraph is rather misty, and I must leave it to some one more enlightened than myself to discover whether it is the vapour, or the water, or the spring itself that so readily takes fire, and in which of the three eggs and bacon can be boiled, while *the water itself is cold*. A spring at King's Cliff, near Stamford, will not act on a strong person, unless he drinks from three to five quarts! And from another a dose of the same quantity is prescribed as restoring a constitution weakened by *hard drinking*.

I should be glad to know (and so ought the public at large) if the Dog and Duck public-house still stands anywhere in St. George's Fields, and whether it still continues to supply those "pungent brackish" waters which formerly saved so many lives.

Concerning coal we are told,—

"It is plain that coals consist of a spungy earth, impregnated plentifully with bituminous juice, and if they are deprived of the bitumen they can never be made to flame or smoke. Hence it appears that coals are so far from doing harm that they are rather beneficial by drying up the too great humidity of the blood, and preserving the body from putrefaction. Where the atmosphere is very moist, and full of watery vapours, so hurtful to human bodies, the burning of coals is certainly very proper. It is certain that in London, since the burning of pit-coal has been almost universal, no plague has ever affected that city, nor any disease of that kind, and therefore there is no reason to be afraid of it, unless it be brought from foreign countries."

Every evil has its accompanying good, and we have no right to find fault with the smoke of London if it keeps away the plague.

Concerning the origin of the stones called belemnites, we have the opinions of a host of naturalists, considering them respectively as a sea-plant, a mineral production of the earth, the horn of the fish called narwhal, a stalactite or fossil pipe, formed by flowers, the teeth of a crocodile or some sort of whale, the prickle of a sort of hedgehog, &c. Dr. Brookes refrains from giving any opinion of his own; but we may recollect for our comfort that belemnites are "good against the nightmare." Listen, O epicures; here is a remedy for you—go into a lias quarry and get a bag of thunderbolts, alias belemnites, and take one every night after supper.

"There has been a great number of monstrous teeth found in different parts of England; and in Essex there were two met with in the reign of Richard I. which were large enough to make two hundred each of the common size."

There was found in London, among other remains, a thigh-bone three feet two inches long, and these a certain Dr. Plott opined belonged to men or women; for there was a giant living in France about two hundred years before his time so tall that a man of common stature might go upright between his legs.

There are many cuts of stones curiously shaped given in the book, with names awarded according to fancied resemblances—*e.g.*, the Kidney-stone, the Owl-stone, the Horse-head-stone, the Olfactory-nerve-stone, Worm-stones, &c. &c.

Coral is said to be of a "stony nature, and is placed in the animal kingdom because it produces sea insects." So far good; but Dr. B. himself believes it to be of a vegetable nature, and enters at some length on the mode of reproduction.

Folkestone. HENRY ULLYETT.

RHIZOSOLENIA.—In SCIENCE-GOSSIP, vol. iii., page 35, is contained a reference to Mr. Brightwell's notice of the genus Rhizosolenia, accompanied with figures of two of the species, viz., *R. styliformis* and *R. imbricata*. Concerning the members of this genus, the writer says, that "besides the singularity of their forms they are remarkable for being only found in the interior of marine animals—chiefly Ascidians." Of the five species indigenous to Britain, Mr. Norman is reported to have found one, and Mr. Brightwell the remaining four. It would appear that both these gentlemen obtained their specimens from the interior of Ascidians and their allies; hence the reason for the statement quoted in SCIENCE-GOSSIP, that they are "only found in the interior of these lowly animals." On the 7th July I took a gathering of Diatomaceæ from the surface of mud in Whitehaven harbour, which, on examination, proved to contain a large proportion of *R. styliformis*. To make sure that there was no mistake, I obtained another from near the same place the following day, with similar results. On the 9th I secured a third collection which contained a still greater proportion of this form. I have also found it in Chincha Island guano, in a fossil state. The specimen preserved in the guano deposit might perhaps be obtained by the sea birds from the source indicated by Mr. Brightwell. Of course we cannot tell; but there can be no doubt that they are to be had in a more natural condition, as is proved by the fact I have stated above. They were associated with *P. angulatum*, *P. æstuarii*, and a few other species, which usually abound in the tidal harbours of Cumberland at this season. I presume that careful and combined observation would prove that the other species of this genus are neither rare in their occurrence, nor special in their habitat.—*B. Taylor.*

ZOOLOGY.

Death's-head.—Having reared more than a dozen specimens of the Death's-head moth (*Acherontia atropos*) from chrysalides during one season a few years ago, and one specimen last month, I beg to offer a few remarks on this very peculiar insect. All my specimens emerged from the chrysalides in the evening, generally after 9 p.m. One of them, a fine female, kept her wings "hanging down to dry" during the whole of one night, although in a room. The squeaking noise made by this moth is said to be occasionally produced by it while still within the pupa case, but this is contrary to my experience; the chrysalis being large and active, with a horny covering or shell, a scraping noise is certainly produced when it twists its abdomen about and rubs it on the earth or on the sides of the box in which it is placed, but this is quite of a different nature from the squeak of the moth. The caterpillar, also, has been stated to make a cracking noise on being disturbed; but all I have ever seen or possessed have been perfectly quiet. Two or three of my entomological friends have had the same experience with this insect. The black band nearest the end of the abdomen in the male is absent in the female; and I also noticed that the skull-like mark on the thorax is more distinct in the female than in the male.—*T. W. Wood.*

Helix pomatia was introduced by Linnæus into his garden at Upsal. It existed there a few years since, and probably is there now. It occurs nowhere else in Sweden.—*L.*

Spiders.—I rather imagine from the description given by your correspondent "S. B., Parson's Green," of his spiders, that they belong to a little species usually called "jumping spiders," for these *hibernate* in a sort of silken-valved tube, and this would account for "S. B.'s" guests having lived in their cases without food during the voyage homeward. They were probably asleep when packed up. They, the jumpers, belong to the genus *Attus,* and eat flies. I also fancy from what I hear from friends of mine now out in Ceylon that the spiders there are very like our own,—I mean the *real web-making spiders,* not those horrid monsters called Tarantula—though, in fact, they have no right to the name Tarantula any more than they have to that of *Epiera.* A young lady writing to me lately of this repulsive creature, the *Mygale,* declares that it is more like a large dirty-looking crab—a "hairy crab"—than a spider, and says she has several times been made fearfully ill by seeing it devour good-sized crickets. She is, I need scarcely add, no naturalist in her tastes, and consequently does not find sufficient interest in the study of animals to aid her in overcoming her feminine terror or disgust at the sight of one creature preying on another.—*Mrs. Alfred Watney.*

Spider Poison.—F. R. M., in the last number of Science-Gossip, observes that a spider drew blood from her or his hand, and thereby impugns the truth, not of my *assertion,* but of my *observations* on the same point. All I can say is that I have frequently submitted to being bitten on the hand by *Tegenaria domestica,* which is one of the largest and fiercest of our native spiders, and although a rather sharp nip ensued from Tegenaria's fangs, they invariably failed to penetrate the skin. Moreover several friends of mine tried the experiment of being bitten with the same result as myself. Now, whatever may be the case with my friends, my skin is certainly not of more than the average density; in fact, it is rather below it. Without therefore doubting for a moment your correspondent's veracity, I cannot help thinking that hers or his is an exceptional case, either caused by a peculiarly thin epidermis, or perchance by the exceptionably large size and ferocity of the spider. After all, *que l'emporte,* there is no rule without exceptions.—*T. Graham Ponton.*

Dentalium.—Is your correspondent sure that his shell was a Dentalium, and, if so, was the animal alive in it? My reason for asking is, that *all* species of this genus are *marine.*—*T. G. P.*

Another correspondent suggests that it may be a caddis-case, and recommends that it be submitted to a competent authority.

Bird Destruction.—In this neighbourhood great numbers of our "feathered friends" have been, for some time past, shot by persons who get their living by preparing their feathers for sale. The feathers, after undergoing some kind of preparation, are disposed of to the milliners, who use them for "trimmings" for the head-dresses of the fair sex. Among the birds killed for the purpose above-mentioned are rooks, starlings, blackbirds, thrushes, and gulls—their gratuitous services in freeing the ground from grubs and other insects not exempting them from slaughter, which is carried on without any regard to the breeding season. I imagine that the practice of shooting birds for their feathers is not confined to this locality, as I have been informed that feathers are in considerable demand—some being *exported.* It has, I believe, been found necessary on the Continent to pass laws for the protection of the birds, as their services could not be dispensed with, and I think they ought to be similarly protected in this country. I have taken the liberty of bringing the matter before the readers of Science-Gossip, who I think will regret that our British birds should be thus wantonly destroyed.—*W. H.*

Sea-Horses, or Hippocampi.—All who have not yet seen the living sea-horses in the possession of Mr. G. H. King, of Great Portland Street, should not lose the opportunity. They are called "sea horses," but are in reality odd little fishes, and for some information about them we refer our readers to the two or three communications entitled "Odd Fishes" contributed to our volume for 1866 by Mr. J. K. Lord, especially the remarks at page 100. Mr. King has made several excursions in search of these oddities, and his last trip was eminently successful.

American Blight (*Schizoneura lanigera*).—"It was first noticed in England in 1787, and appeared in France in 1812, and in Belgium in 1829. The first generation proceeding from an egg in the spring, is followed in the course of the year by nine successive generations, and as each generation is multiplied one hundredfold, in the next, the tenth will amount to one quintillion, and as each individual of these deposits on an average thirty eggs, there will be thirty quintillions of eggs laid up for the next year." The wingless viviparous female when very young is pale red, narrow, flat, linear. When full-grown it is dull dark red or brownish-red, oval, plump, shining and covered with white powder and filaments: there are two rows of tubercles along the back. The antennæ are four-jointed, setaceous, and about a quarter or one-sixth of the length of the body; the rostrum reaches a little beyond the hind coxæ; the legs are short. In the beginning of June it becomes extremely abundant, and large clusters appear enveloped in masses of cottony matter with little globules of whitish-green gluten.—*F. W.*

The white Cabbage Butterfly (*Pontia brassica*) is more plentiful this year than I ever remember to have seen it. At the time of my writing, I can anywhere see as many as a hundred examples from any spot about my parish, and with these is a small sprinkling of some half-dozen rarer species. Already the cottagers' cabbages are suffering from the earlier brood of the larvæ of these pests to the garden; and where not hand-gathered, they soon destroy the whole hopes of this useful crop. The way to save the cabbages, greens, &c., is to examine the under parts of the leaves from time to time, and to crush the little bunches of yellow eggs with the finger. Once show a child how to do this, and very little difficulty will be experienced in keeping the grubs in check. The present warm season has caused the appearance of the Humming-bird Hawk-moth, *Macroglossa stellatarum*, in some quantity. In the warm summer of 1863 this moth abounded in Dorset; but that it is only occasionally plentiful will be shown from the fact that visitors to Weymouth readily yielded to a tariff of 4d. each for specimens of these creatures, and it has not been since then, until the present summer, that we have observed it in any quantity.—*J. B., Bradford Abbas*, July 15, 1868.

Animal Sagacity.—The following is from an old newspaper, under date 1816:—"I was exceedingly amused with the article on Animal Sagacity in a late paper; such instances bring the animal very closely to the human species, in reason and good conduct. They are nearly as surprising as that anecdote (related by Goldsmith, I believe) of a venerable dog, who had been brought up and instructed in the family of a strict Roman Catholic, and who, at the close of his life, was sent across the channel into Wales, to finish his days in the family of a Protestant. Such, however, was the force of habit, that nothing, from the moment he entered the Protestant circle, would tempt him to eat meat, either on Wednesdays or Fridays. But the following instance of sagacity in the canine breed is far more astonishing. It was related to me by a Prussian officer, who lately visited this metropolis, as an undeniable fact, and names of persons and places attended the relation of it. A German count had a very valuable dog, a large and noble-looking animal; in some description of field sports he was reckoned exceedingly useful, and a friend of the Count's applied for the loan of the dog for a few weeks' excursion in the country; it was granted; and, in the course of the rambles, the dog, by a fall, either dislocated or gave a severe fracture to one of his legs. The borrower of the dog was in the greatest alarm, knowing well how greatly the Count valued him; and, fearing to disclose the fact, brought him secretly to the Count's surgeon, a skilful man, to restore the limb. After some weeks' application, the surgeon succeeded, the dog was returned, and all was well. A month or six weeks after this period, the surgeon was sitting gravely in his closet, pursuing his studies, when he heard a violent scratching at the bottom of the door; he rose, and on opening it, to his surprise, he saw the dog, his late patient, before him, in company with another dog, who had broken his leg, and was thus brought by his friend to be cured in the same manner. I have heard before now a farmer say that he had a horse in his stable who always, on losing his shoe, went of his own accord to a farrier's shop, a mile off; but I never yet heard of a horse taking another horse to a farrier for the purpose. In the case of the dogs there must have been a communication of ideas; they must have come to a conclusion before they set out; they must have reasoned together on the way, discussing the merits of the surgeon, and the nature of the wound.—*T. B., Gray's Inn*, Dec., 1816."

BOTANY.

Claytonia alsinoides.—I recently saw this plant in considerable abundance in a wood at Ince, Cheshire. Its occurrence near Perth caused much discussion in the new series of the *Phytologist;* however, it appears to have been growing in the above locality for a long time. It is a native of Nootka Sound, and has no right whatever to be included in a list of British plants.—*J. F. R.*

Primroses.—The last number of the "Journal of the Linnæan Society" (No. 47, Botany) contains two papers by that indefatigable worker Mr. Charles Darwin, on the "character and hybrid-like nature of the offspring from the illegitimate unions of Dimorphic and Trimorphic plants," and on "the specific difference between *Primula veris*, *Primula vulgaris*, and *Primula elatior*, and on the hybrid nature of the common oxlip, with supplementary remarks on naturally-produced hybrids in the genus Verbascum."

Timothy-Grass.—This well-known agricultural grass (*Phleum pratense*) acquired its name in a peculiar manner. It is a truly British grass, and yet it is named after an American! The fact is, it was imported into the United States, together with a number of other English seeds, a great many years ago. It soon acquired notoriety from its excellent qualities, and having been largely grown by a certain Mr. Timothy Hanson, was reintroduced into England by him, and has ever since been distinguished by his Christian name. We still import the bulk of our seed from the States and Canada for agricultural purposes, though it is one of the commonest of our grasses.—*W. W. S.*

Royal Fern.—It is not unusual to find *Osmunda regalis* in spots such as those on the Cornish coast, as described by Mr. G. R. Perrin in the July number of Science-Gossip. In the island of Arran it is abundant on the precipitous face of the old sea-cliff on the north-west and west coasts. The rock on which it grows is slate, but further south is sandstone, in which are some caves, and one is called the "King's Cove," where this fern is plentiful, associated with *Asplenium marinum*. It is now chiefly confined to the inaccessible parts of the sea-cliff. I have also found it in North Wales in similar situations.—*J. F. D.*

Lemna gibba.—I can confirm the remarks of your correspondent "J. B., Bristol," respecting *Lemna gibba*. I find it in two places at Sutton Park: on a large pool called Powell's Pool, covering about an acre and a half, the water of which is used as a motive power, so not at all likely to be stagnant; and on a deep, rather slow stream, which ultimately runs into the pool before mentioned.—*James Bagnall.*

Lemna gibba.—This plant is plentiful in Frodsham Marshes, only distant about ten miles from Chester; yet I am not aware that I ever saw it growing in anything but stagnant ditches. Is not the locality mentioned by "J. B." on page 162 a stagnant pool? and has it ever been seen growing in "running streams"?—*J. F. R.*

Oxalis corniculata rubra.—Can any reader tell me the proper name of the plant which is known to the gardeners by the above title? The plant itself is one of the most beautiful and useful species for bordering that I know. I first saw it in 1867, when many of the beds below the Round Tower of Windsor were edged with a thick border of it. The plant is much larger in every respect than *O. corniculata*, and produces cymes of bright golden-yellow flowers, which have a darker ring in their centre; the foliage is of a rich brown, and the contrast between the two is most effective. When I add that the plant is a remarkably free flowerer, that it spreads very rapidly, and grows readily from seed, I think I am justified in expressing astonishment that it is not more generally known and used. The only drawback to its effectiveness is that the blossoms open only in sunshine, and usually close about 1 p.m., but even then the foliage is in itself sufficiently handsome to be very striking. As this *Oxalis* is absent from many seed catalogues, I may just mention that seed is supplied by Messrs. Henderson & Son, of Wellington Road, St. John's Wood, N.W., in 6d. packets, and is called by them *Oxalis corniculata rubra* (*O. tropæoloides*). This latter may possibly be the correct botanical name. —*B.*

Metropolitan Ferns.—I believe it is not very generally known amongst botanists in London, that the Common Adders-tongue Fern (*Ophioglossum vulgatum*) is growing in abundance in the Hackney Marshes, about three-quarters of a mile from the east side of Victoria Park. Last year I found them there, though it was too late in the season to procure good plants. This is no new discovery, however, for soon after noticing them there, I found the Marshes given as a locality in Moore's Nature-printed British Ferns. The soil being a very stiff loam, and the roots running very deep, a long and stiff tool will be found necessary to remove the plants entire. While speaking of ferns, I would ask whether a bifurcated *fertile* frond of the *Blechnum spicant* is of common occurrence? The only instance seen is one which I collected in Cornwall last September. It is about fourteen inches in length and is divided into two about four inches from the end, each branch being in every respect similar to the main frond. This "sporting" is well known in *Scolopendrium vulgare*, but I cannot hear of another similar to this.—*T. Davies, 47, Rutland-road, South Hackney.*

MICROSCOPY.

Diatom-type Slide.—At the last meeting of the Quekett Microscopical Club (June 26th) an object was exhibited which proved a great attraction. This was Möller's "Diatomaceen Typen Platte," one of which had been sent from Prussia for exhibition to the members, through the kindness of Herr Weissflog, of Schoenebeck. It is an ordinary 3 by 1 inch glass slide, with the objects in the centre occupying a square about the eighth of an inch in diameter. This square consists of four smaller squares each containing about 100 diatoms arranged in parallel lines and consecutive order, so that the slide contains 400 diatoms belonging to 370 species, types of the genera and subdivisions. This is therefore a slide of the typical forms of Diatomaceæ, the key to which is a book which accompanies it, and in which the name of each diatom, according to its line and its position upon that line, is easily found. As an example of microscopical mounting, it was regarded as a marvel of ingenuity and perseverance, some of the species being represented by a side and a front view. The great problem appeared to be how it could have been accomplished, how the straight lines were invariably maintained, how such very minute objects could have been arranged to the number of 400 in consecutive order, and then covered without the fracture or displacement of a single frustule. The price at which they are supplied by Mr. J. D. Möller, of Wedel, in Holstein, viz., three pounds sterling, is not large when the labour of production is taken into account. Other slides of diatoms and other objects by the same manipulator, we have examined, and consider them good and cheap; let us hope that this will be one inducement for British microscopists to cultivate a better acquaintance with their continental neighbours and fellow-workers.

Silkworm Disease.—The terrible suffering that has been caused in the south of France by the disease which has attacked the silkworms for the last twenty years—it made its appearance in 1848—has drawn the attention of scientific men to the subject, and M. Pasteur, the great authority on ferments, has taken up the subject. He is of opinion that the value of the eggs, or seeds (*graines*, as the silkworm's eggs are called in France), may be tested by means of the microscope, and he has published a clear account of the appearance presented by the sound and diseased eggs. Several proprietors and others have tried experiments with eggs thus selected with marked success. Amongst others, M. Henri Marès, of Montpelier, who has an immense breadth of land under vines in the plain of Launac, near Frontignan, and to whom France is indebted for the application of sulphur as a preventive of the *oidium* or vine disease, has tested M. Pasteur's plan on a considerable scale. Before the middle of May, many of the worms had undergone all their transformations, and some few were busy spinning their cocoons; they looked perfectly healthy and were of great size, and everything promised well for the experiment. The fact must not, however, be overlooked, that the fine appearance of the worms cannot be attributed to the selection of the eggs alone; M. Marès' lofts are well supplied with mulberry leaves, and kept carefully clean; the experiment is, in short, carried on by a man of high education, scientific attainments, and active habits, and thus the causes of success are double,—microscopic selection of eggs and sanitary arrangement. The poor silkworm-breeders generally present a very different spectacle; their chambers are kept at a great heat, without any careful arrangement against draughts, while the supply of food and the cleansing often suffer from want of sufficient hands to carry the operations out properly. M. Marès is not of opinion that the stripping of the mulberry-trees causes the leaves to lose their value as food for the worms; his trees are reduced to bare poles during the season, and yet they present a most vigorous appearance. It is to be hoped that the efforts of the government, aided by men like M. Pasteur, M. Guérin Méneville, and M. Marès, will soon eradicate the silkworm disease, which has cost France and other countries so many millions.—*Journal of the Society of Arts*, June 5th.

Pocket Finder.—A very convenient and useful little instrument is made by Mr. E. Wheeler, of Holloway, which is, in fact, a pocket microscope. It consists of a tube about four inches in length, and less than three-fourths of an inch in diameter, with a Huyghenian eye-piece, and a triplet (objective) of about half an inch power. A movable cap bearing a plain glass disc slips over the objective, and when it is desired to test a gathering of Diatoms or Desmids, a little is placed upon the glass disc and the cap drawn outwards, until the object is in focus. For all practical purposes it is sufficiently powerful for field-work, will really go into the waistcoat pocket, and costs about a guinea; so that it is efficient, portable, and cheap. We commend it to the attention of all collectors of microscopical objects and field-workers.

Maple Blight.—Since writing the notice of this fungus at page 136, we have received specimens from the United States, and upon examination consider them to belong to the same species (*Uncinula bicornis*, Lev.) notwithstanding, that the tips of the appendages are *not* divided, but simply recurved, in a circinate manner. Dr. Leveille remarks that the specific name is not a good one, since the appendages are sometimes simple, and sometimes forked. Our American specimens are on Maple leaves from South Carolina.

NOTES AND QUERIES.

Early Flowering in Spring, 1868.—It has been asserted in your pages and elsewhere that the past spring was an unusually early season. On the other hand I find that there are parties who question this statement. As I have for the last five years kept a tolerably accurate record of the flowering of plants about Belfast, perhaps it might be of interest to give a brief summary comparing this season with former ones. The table given below has been carefully compiled from my notes of the first coming into flower of 271 plants, of which 8 appear in February, 30 in March, 71 in April, 61 in May, and 101 in June; it shows that there was on the average of the whole 271 species an advance of fifteen days in the present year, as compared with 1867, which was a late season. Further, it will appear from my table that not only did our plants flower this year sooner than last year, but also that they were earlier than in any year since my record was commenced. As compared with the earliest of the last five years the result is that the spring of 1868 was six days in advance. The results are given separately for each month and it will be seen that the greatest degree of forwardness of vegetation was in the earlier months of the year. This no doubt is due to the very mild weather we enjoyed during last winter. As the summer came on the distinction in favour of this year became less, and as far as I have observed in the present month, our July plants are not earlier than usual. The excessive drought and heat we have lately experienced rather retard than forward the flowering of plants. Table showing the flowering of plants in 1868, as compared with 1867, and also with the earliest of the last five years:—

1868. Months.	In advance of 1867.	In advance of the earliest year.
February	16 days.	12 days.
March........	27 days.	11 days.
April	14 days.	7 days.
May..........	10 days.	3 days.
June	9 days.	Three days behind the earliest year.

I may remark that in compiling the above table I have noticed only common plants, those which owing to their frequency, I believed I had seen at or very near their first appearance. Of course I don't pretend that the estimate founded on my notes is critically correct in every respect: that could not be, unless one noted each species in the same spot year after year, as plants flower earlier in some localities than they do in others. But when the comparison extends over so many species we may assume that the general result will be substantially correct. The rather small number of plants (61) observed in May was owing to my inability to be out as much as usual during that month.—*S. A. Stewart, Belfast.*

Caddis-cases.—We think it advisable to inform our readers that the appearance of an article in the *Popular Science Review* on Caddis-flies, simultaneously with one on Caddis-cases, by another gentleman, in our own pages, was not premeditated, nor could any opposition have been designed, since neither the authors of the papers nor the editor of either journal were admitted to the secrets of the others' intentions, and all were alike surprised at the dénouement.

Honey.—Can any reader of Science-Gossip inform me how to prevent honey fermenting, or to check fermentation when once commenced?—*E. K. B.*

Spider Poison.—Apropos of the discussion on the biting capabilities of English spiders. A lady tells me that about thirty years ago, when she was living at Clapton, her nurse was amusing the children one evening by causing a rather large spider to run round and round the table. The insect getting tired of the performance, sprang upon her bare arm, and inflicted a bite that caused so alarming a swelling of the limb, that the doctor was called in, and applied poultices to relieve the wound.—*R. H. N. B.*

Eel Freak.—On Tuesday, the 30th of June last, as my two little boys were rowing me to Monasterevan in a canvas boat on the river Barrow, much to our astonishment, a large eel jumped into the boat. It was getting dark at the time, and there was a small flood in the river. We can only account for it by supposing that he was running on the top of the water, and was struck by an oar, and in his fright gave himself up to us. The oldest fisherman on the river has never heard of an eel doing so before. He proved to be a very pleasant guest at our table next day.—*Thomas B. Harpur.*

Dreissena.—If *Dreissena polymorpha*, inquired after by T. G. P. in Science-Gossip for July is the *Mytilus polymorphus* of Turton, I can assure him it breeds abundantly in Staffordshire. I have found it in clusters, and of various sizes, both in the river Sow, between Stafford and the Infirmary, and in the canals nearer to Acton Hill and Rickerscote, running out of the same river. In the year 1842 I received young ones from streams near Exmouth, but to what attached I don't know. In the Sow I have taken them out of the river affixed by a byssus to the stems of the Willow and Water Mints, in any part where the bank did not slope down gradually. I have one or two of the young at T. G. P.'s service still, if of any use, though seven years old.—*L. M. Pratten.*

Parasites on Caterpillar.—We have received a caterpillar, from some correspondent without name, sprinkled with elongated white dots, of which the following is an explanation:—"The white dots on the sides of the body (towards the head) of the caterpillar of *Geometra prodromaria* are the eggs of an Ichneumon deposited on the surface of the skin, to which they are very firmly glued. The young grubs are already hatched, and I extracted one of minute size which had already bored its way into the body of the caterpillar through the thin skin close to the end of the egg, the extremity of the body being still visible at the orifice of the hole by which it had entered."—*I. O. W.*

Gold Fish.—Can you give me any explanation of the cause of gold and silver fish, after being in an aquarium for a short time, going black in patches, resulting in an unsteady motion in swimming, ending in death, and whether there is any remedy by which to preserve them?—*E. Y.*

Dreissena polymorpha.—In answer to your correspondent T. G. P. in this month's number, I beg to state that I have found *Dreissena polymorpha* in the Isis at Oxford, near to the confluence of the Cherwell and that river.—*W. Hambrough.*

EBONY OR HEBEN.—The beautiful black wood which we know by the name of Ebony, is the inner part of the trunk, the heart-wood, of a great many species of *Diospyros*—large trees, natives chiefly of the Tropics; therefore I cannot quite agree with your correspondent Mr. Walter W. Skeat, in thinking that it was the "cursed juice" described by the kingly ghost at Elsinore, seeing more especially that not one of the genus producing ebony-wood yields a poisonous extract. The *gaub*, as the *Diospyros embryopteris* is termed by the natives, bears a very astringent fruit, somewhat like an egg in shape, and before it ripens a gum is extracted from it, which the fishing tribes value highly as a coating for their nets, because it renders the meshes stronger; but it is not hurtful. The *D. Virginiana*, Date-plum of the United States, belongs to this family (there are about four species found in America), and the Kaki of the Celestial Empire is another; both these trees bear edible fruit. The brilliant red apple of the Kaki makes a very delicious plum-flavoured sweetmeat. I cannot, however, say much in praise of the rough-tasting yellow American berries, though the Southerners do make a kind of beer from them. The best Ebony comes from a tree found in the Mauritius.—*Helen E. Watney, Hambledon.*

GENTIANS.—My appeal for winter-greens was so kindly responded to, that I am emboldened to make one more request. Will any one send me *fresh* specimens of *Gentiana campestris, G. Pneumonanthe*, or *Cicendia filiformis?* I can offer *Gen. Amarella* and *G. germanica* to any who may want them.—*James Britten, High Wycombe.*

SCARECROWS.—My garden is a favourite place for Blackbirds and Thrushes, as well as a good place for fruit; and they seem too knowing in the present day to care much for the scarecrows, &c. mentioned in your last number. Indeed, with us they care very little for human ones. They will just fly into a near bush, and chatter and scold till one's back is turned. As to frightening them away with a gun it is perhaps effectual, but very bad for the garden and their happy singing. I generally net the currant-trees, and yet they will get underneath in the most determined way; but still with care and good management one can get plenty of fruit, and yet let the poor birds have a share. It only pays them for the good they do. If we want to keep them away from any particular spot, we generally hang up one or two common looking-glasses by a string. They keep turning round and reflecting the light and other objects in apparent motion; and this I have found for some years a more effectual plan for keeping the birds at a proper distance than any other I have tried.—*E. T. S.*

OSTRICHES.—Opening a volume of *All the Year Round* for 1860, not long ago, I came upon a paper in which is detailed the writer's experience in regard to Ostriches "in their own deserts." In speaking of their nidification he makes the following statement:—"The female arranges the eggs (a score or two dozen) in a triangle, with the point in front of her when she is sitting. Two or three of them, therefore, do not get sufficiently warmed by her body; and these unhatched eggs she breaks to provide food for the young birds during the first few days after they have left their shells." This statement of the young Ostriches being fed on eggs provided by their own mother is so completely *sui generis*, that I should be much obliged to any correspondent experienced in the ways of Ostriches who would confirm or refute it. I think, too, it would interest others of your readers, who are fond of ornithology.—*W. W. Spicer, Clifton.*

GOLD-FISH HATCHING.—Will W. O. (SCIENCE-GOSSIP, vol. iv. p. 165) kindly tell us of what the regular supplies of food consisted which he so successfully gave to his gold fish; and also what plants he found to thrive best in the aquarium?—*X., Edgbaston.*

ONIONS AND EPIDEMICS.—In the spring of 1849 I was in charge of one hundred men on shipboard, with the cholera among the men. We had onions, which a number of the men ate freely. Those who did so were soon attacked, and nearly all died. As soon as I made this discovery their use was forbidden. After mature reflection I came to the conclusion that onions should never be eaten during the prevalence of epidemics, for the reason that they absorb the virus and communicate the disease, and that the proper use for them is sliced and placed in the sick room, and replaced with fresh ones every few hours. It is a well-established fact that onions will extract the poison of snakes: this I personally know. Some kinds of mud will do the same. After maintaining the foregoing opinion for eighteen years, I have found the following well attested: Onions placed in the room where there is small-pox will blister and decompose with great rapidity; not only so, but will prevent the spread of the disease. I think as a disinfectant they have no equal, when properly used; but keep them out of the stomach. If need be, the foregoing (which I have greatly abbreviated) can be attested on oath.—*John B. Wolff, in "Scientific American," March* 14.

PETROLEUM AS AN INSECTICIDE.—The following paragraph from the *Union Médicale*, June 27, and reprinted in a London medical journal, may supply the wants of L. V. H., in SCIENCE-GOSSIP of July, 1868. Petroleum oil possesses the highest efficacy as a destroyer of all kinds of insects injurious to plants or animals, and the less purified, and consequently the cheaper it is, the better. Thirty parts should be mixed with 1,000 of water, and applied where required. So also vermin of houses may be destroyed by introducing into the holes or cracks a few drops of petroleum.—*R. O.*

ANTS AND APHIDES.—On the afternoon of the 17th May, while lying down on the grass in "Meads," I disturbed an ants' nest, where were a number of aphides, and the ants immediately began to take them up in their mouths and carry them away, but when they got a little quieter I several times distinctly saw an ant come up to one of the aphides, and just touch it with its jaws, and then the aphis put out a drop of something that looked like clear water, which the ant drank, and then went on with whatever he was doing. I have often heard it asserted that ants keep aphides as cows, and milk them, but never actually saw it done before.—*E. D. H. D., Winchester.*

DOES THE ROBIN CHANGE THE COLOUR OF ITS PLUMAGE?—This morning, in my garden at Hampstead, I saw one with the plumage nearly that of the brown linnet, but on the breast slightly more yellow. There could be no mistake about its being a robin, from the peculiar movements of head and wing when on the ground.—*J. H.*, July 20.

The Birds of Killingworth.

By Professor Longfellow.

* * * * *

Thus came the jocund spring in Killingworth,
In fabulous days, some hundred years ago;
And thrifty farmers as they tilled the earth,
Heard with alarm the cawing of the crow,
That mingled with the universal mirth,
Cassandra-like, prognosticating woe;
They shook their heads, and doomed with dreadful words
To swift destruction the whole race of birds.

And a town meeting was convened straightway
To set a price upon the guilty heads
Of these marauders, who, in lieu of pay,
Levied black mail upon the garden-beds
And cornfields, and beheld without dismay
The awful scarecrow, with his fluttering shreds;
The skeleton that waited at their feast,
Whereby their sinful pleasure was increased.

* * * * *

And so the dreadful massacre began;
O'er fields and orchards, and o'er woodland crests,
The ceaseless fusillade of terror ran,
Dead fell the birds, with blood-stains on their breasts,
Or wounded crept away from sight of man,
While the young died of famine in their nests;
A slaughter to be told in groans, not words,
The very St. Bartholomew of Birds!

We give three stanzas only, out of thirty of which this poem is composed. Should this be sufficient to stimulate a desire for more, the whole of the poetical works of the "Professor" are now published at such a ridiculously low price that they are within reach of the humblest artisan.—Ed.

The Parson-Bird.—Your correspondent is not quite correct in the description of the Parson-bird. I also have resided in both the north and extreme south of New Zealand, and when living near Invercargill, in the bush, had many facilities for watching and studying the habits of this bird. I have shot many, and preserved the skin of one, which is now before me. Its coat is not "*quite*" black, for there is a patch of white feathers on either wing, and the curled white feathers "*not one each side the beak*," but in a tuft under the throat. The Parson-bird, *Prosthemadera Novæ Zealandiæ* (*Tui Koko* of the natives), is found in nearly every bush in New Zealand, and its habits have been correctly described by that gentleman. Mr. T. P. Barkas was certainly misinformed respecting "*this bird*" living on mollusca, and dropping pebbles between the shells; but there is a New Zealand bird which seeks a living in the manner described. I cannot remember the bird's name.—*J. E. Mapplebeck, Moseley.*

Bees at Laurel.—It has long been noticed that honey-bees are very busy about the young leaves of the laurel. Has it been observed that the particular part they visit is always the same—the under side of the leaf very near the stalk? I have examined a very large number of young leaves, and find upon every one of them small spots of a reddish-brown colour. They are most frequently two in number, one on each side the main fibre which runs up the middle of the leaf, upon or near the spot where the second lateral fibre branches off from it. Sometimes they are more numerous. I have just gathered a stalk, each of the young leaves on which has two such spots on each side the main fibre. I can see them distinctly on a young leaf about 1¼ in. long, and not yet quite opened. I am certain, by observation, that it is these spots only that the bees visit. *Quest.* How are they made? and what do they supply to the bees? It is a question of practical importance; because it may lead to discoveries as to supplying bees artificially, a subject of considerable importance to bee-keepers, and to which much attention has lately been turned, especially in France. I am pretty sure that the spot is caused by a wound; and also that the wound is made by some other insect, not by the bee. If you examine old leaves (those I imagine of last year or even older), the wound does not appear fresh; but you will easily see that it has existed, and has been healed.—*H. W. W.*

Curious Optical Effect.—I have for some period noticed that at times my eyes differed in their perception of colour—*i.e.*, the same colour would appear darker to one eye than the other. On first noticing it, I thought it must be caused by an actual difference between my eyes; but as I find this effect is only perceivable in a side light, or immediately after having been in a side light, and that the eye next the light is the one least sensitive to colour, I now attribute it to the stray rays of white light entering that eye, and rendering the retina less sensitive, the other eye being shaded by the nose. Light browns, reds, and flesh-colour, particularly the latter, exhibit this effect the best. Possibly some of your correspondents may have noticed this effect, and be able to say if my solution is correct.—*W. H. K.*

Temperature in May.—The average temperature during the month of May at 9 o'clock a.m., at which time diurnal observations were taken, was 61° 30′ Fahr. in the shade. This result was obtained at Harleston, a small town about twenty miles south of Norwich. The weather has been almost uniformly fine, and the wind has blown mostly from a southerly direction.—*J. H. F.*

Insect Eggs.—We are all familiar with the pretty eggs of moths as microscopic objects, and unfortunately are likewise familiar with their broken-up condition, when the mature caterpillar has eaten his way out of the shell. Can any of your correspondents tell me of a good plan of killing the grub before its appearance, so as to afford the means of mounting the eggs *in situ?*—*H. A. S.*

Goldfinches.—Can you inform me if goldfinches reared this year, will breed with a canary hen next year? I have been told it is no use putting a goldfinch cock to a canary till he is two years old.—*J. W. Whelan.*

The Zebra Mussel (*Dreissena polymorpha*) occurs in the Wakefield and Barnsley canal about two miles from Wakefield (Science-Gossip p. 166). I found this shell with *Paludina vivipara*, *Unio turnidus* (var. *radiata*), and *Anodon cygnea*, together with a sponge in one spot at Agbrigg, two miles south of Wakefield. *D. polymorpha* also occurs in the reservoirs at Cold Hiendley between Wakefield and Barnsley. In a manuscript list of Wakefield shells which I have by me, *D. polymorpha* is described as "common." In Hobkirk's list of Huddersfield shells it is not mentioned.—*Geo. Roberts, Lofthouse.*

NOTICES TO CORRESPONDENTS.

All communications relative to advertisements, post-office orders, and orders for the supply of this Journal should be addressed to the Publisher. All contributions, books, and pamphlets for the Editor should be sent to 192, Piccadilly, London, W. To avoid disappointment, contributions should not be received later than the 15th of each month. *No notice whatever can be taken of communications which do not contain the name and address of the writer,* not necessarily for publication, if desired to be withheld. We do not undertake to answer any queries not specially connected with Natural History, in accordance with our acceptance of that term; nor can we answer queries which might be solved by the correspondent b yan appeal to any elementary book on the subject. We are always prepared to accept queries of a critical nature, and to publish the replies, provided *some* of our readers, besides the querist, are likely to be interested in them. We cannot undertake to return rejected manuscripts unless sufficient stamps are enclosed to cover the return postage. Neither can we promise to refer to or return any manuscript after one month from the date of its receipt. All microscopical drawings intended for publication should have annexed thereto the powers employed, or the extent of enlargement, indicated in diameters (thus: × 320 diameters). Communications intended for publication should be written on one side of the paper only, and all scientific names, and names of places and individuals, should be as legible as possible. Wherever scientific names or technicalities are employed, it is hoped that the common names will accompany them. Lists or tables are inadmissible under any circumstances. Those of the popular names of British plants and animals are retained and registered for publication when sufficiently complete for that purpose, in whatever form may then be decided upon. Address No. 192, Piccadilly, London, W.

T. S.—A bug known as *Tropicorus rufipes* (Hemiptera—Heteroptera).

F. F.—A Coleopterous larva.

J. S. T.—*Ræstelia lacerata*, very common this year.

R. C.—The best Botany for an amateur is Bentham's Handbook, price twelve shillings.

P. G. M.—We cannot open such a discussion, which from its nature can attain no satisfactory results.

J. B.—No probability of such a work at present.

J. M.—A species of clearwing, *Sphecia apiformis.*

E. J. W.—Most probably, but we cannot name the insect from its nidus with satisfaction.

J. L. E.—Leaf galls, not uncommon.

W. P., T. K.—All the American fossils exchanged.

R. E. C.—Do you innocently believe that the moths you name are rare?

G. C.—Your plant is a species of *Anagallis*, the specimen is insufficient to determine which. A work "in which all foreign plants are described up to the present time" would be rather a voluminous one. You will find a great number of Dicotyledonous exogens in De Candolle's "Prodromus," of which eighteen octavo volumes are published.

J. S.—Your insect on oats is *Aphis avenæ*. See Curtis's "Farm Insects," p. 499.

T. G. P.—The American Blight is *Aphis* (*Schizoneura*) *lanigera*, described by Hausmann in *Illiger's Mag.*, vol. i. p. 440 (1801); see also "Knapp's Journal of a Naturalist," "Harris's Insects injurious to Vegetation," p. 242, and the British Museum Catalogue of Homoptera, vol. iv. p. 1,048. This latter catalogue contains the descriptions of a large number of Aphides.

Silk.—Wanted the address of any firm in the habit of purchasing raw silk.—T. G. P., 9, Arlington Villas, Clifton.

J. W.—We know of no popular work on "Cacti."

"Constant Subscribers" should have learnt by this time that anonymous communications find their way into the waste-paper basket forthwith.

A. W. R.—Put your insects into a bottle with bruised laurel-leaves at the bottom, and they will soon die. Of course you can attract insects by sugaring. Dr. Knaggs's papers "on collecting, &c.," in the *Entomologist's Monthly Magazine* would just suit you.

J. C.—No. 1. *Cladophora albida*; 2. *Ceramium rubrum.*

E. C. B. (Portland.)—*Weissia commutata.—R. B.*

T. R. C.—*Funaria hygrometrica.—R. B.*

F. W.—No. 1. *Rhynchostegium confertum*, with *Homalothecium sericeum.* 2. *Tortula ruralis.—R. B.*

J. B.—*Grimmia patens*, dwarf form.—*R. B.*

E. H.—No. 1. *Hypnum exannulatum.* 2. *Hypnum revolvens.—R. B.*

R. G. A.—*Hypnum* allied to *commutatum* and *falcatum*, probably new. Send address to *R. B.*, care of the Editor.

A. J. (Melrose.)—No. 1. *Tortula* sp.? belonging to the *fallax* group, and probably new. Send address to *R. B.*, care of the Editor. 4. *Brachythecium rivulare.—R. B.*

F. R.—The rose mildew, now exceedingly common, is *Sphærotheca pannosa.*

H. J. R.—Both ferns are *Gymnogramma chærophylla.—J. G. B.*

EXCHANGES.

Minerals and Fossils required in exchange for microscopic objects, mounted and unmounted.—R. S. M., 61, Buckingham Road, N.

English Plants.—A collection dried and carefully mounted, mostly named, and localized with dates, for objects of geological or microscopical interest.—X., 19, Yew-tree Road, Edgbaston, Birmingham.

Fossils from Low Lias, Planorbis Zone, and Sutton Series, ten collections (named) for similar ones from other formations.—C. O. G. Napier, 8, Chippenham Terrace, Harrow Road, W.

Pupæ of Eriogaster lanestris and Cucullia Verbasci for lepidoptera.—G. H. Hunt, St. Augustine's, Norwich.

Wing of Pterophorus pentadactylus (mounted) for good mounted objects.—H. W. S., Church Road, Moseley, Birmingham.

Opuntia Rafinesquiana in exchange for other Cacti.—John Wilson, 4, Meadow View, Whitehaven.

Acari from Bat, probably *Pteroptus Barbastelli*, for exchange.—C. A. J., P.O., Lewisham, S.E.

Turnip Saw-fly (*Athalia centifolia*).—A good supply wanted for mounted objects.—J. B., care of the Editor.

Navicula elliptica.—A pure gathering wanted for good mounted objects.—B. T., care of the Editor.

BOOKS RECEIVED.

"Popular Science Review," July, 1868. London: Robert Hardwicke.

"Quarterly Journal of the High Wycombe Natural History Society." Vol. ii. No. 1, July, 1868. Wycombe: The Society.

"Naturalist's Note-Book," July, 1868. London: 196, Strand.

"Naturalist's Circular," No. 26, July, 1868. London: Henry Hall.

"Country Life." Nos. 46, 47, 48, 49. London: 10, Bolt Court.

"Journal of the Quekett Microscopical Club," No. 3, July, 1868. London: Robert Hardwicke.

"A Manual of Photographic Manipulation," by Lake Price. Second Edition. London: Churchill & Sons.

"The American Naturalist," Seaside Number, July, 1868, Vol. ii. No. 5. Salem: Peabody Academy of Science.

"The Gardener's Magazine," conducted by Shirley Hibberd, F.R.H.S., Part 31, July, 1868. London: E. W. Allen.

"Report of the Liverpool Naturalist's Field Club for the year 1867–8."

"The Geological and Natural History Repertory," edited by S. J. Mackie, F.G.S., No. 36, July, 1868. London: Kent & Co.

"Catalogue of the Phænogamous Plants of the United States east of the Mississippi, and of the Vascular Cryptogamous Plants of North America north of Mexico." Horace Mann, Cambridge, Mass.

"The Portland Catalogue of Maine Plants." Published by the Portland Society of Natural History.

Communications Received.—A. L.—D. W.—W. P.—G. C.—J. B.—C. D.—P. G. M.—J. F. R.—L. M. P.—R. C.—J. F. D.—J. S. T.—T. G. P.—H. W.—W. W. S.—H. L.—E. K. B.—R. H. N. B.—L.—J. L.—T. K.—E. T. S.—M. A. M. P.—T. B. H.—E. J. W.—W. H.—C. O. G. N.—S. J. M. I.—W. L.—S. A. S.—B.—R. D.—W. D. H.—H. A. S.—R. E. C.—D. W.—G. H. H.—H. H. M.—J. W.—A. W. R.—H. W. S.—J. C.—C. A. J.—F. W.—J. W. W.—W. H.—F. R.—J. J. P.—H. W. W.—J. B.—J. H.—S. S.—G. R.—G. M. I. T. R.—R. O. I.—H. J. R.

SILVER MINING IN EASTERN NEVADA.

AT the last soirée of the President of the Geological Society, I was much struck by an exhibition of choice silver, lead, and copper ores which had been brought from Nevada by Colonel Buel, late Commissioner from Eastern Nevada to the Paris Exhibition.

I was induced to pay his agent a visit, and obtained much interesting information. He had on view about two tons of silver and some hundredweights of copper ore, to the value of £1,000 sterling. The freight of this to England cost £250 sterling. Some of his specimens were magnificent and of large size.

Nevada is situated on the western side of the Rocky Mountains, between the Mormon settlement of the Great Salt Lake and California; and was until recently regarded as an unpromising country, but one which those on the land route between the U.S. and California were obliged to traverse.

The story of the development of Eastern Nevada, all within the last six years, reads like a fairy tale.

Early in the month of May, 1862, W. H. Talcott, an *attaché* on the station at Jacob Springs, on the transcontinental stage route, while hauling wood from the hillside, discovered a vein of metal bearing quartz, which proved to contain silver. "The ledge" was registered as a mining claim, and named "The Poney," as the discoverer had been formerly a postilion in the poney express. A few days after and the Reese River Mining district was formed. A code of laws was adopted, and William Talcott, the discoverer, elected recorder. The Reese River valley is five miles in width, and contains many thousand acres of good agricultural land. The mountain in which the silver was found received the name of *Toiyabe*, an Indian name, meaning a range of hills; these are composed of granite and gneiss, generally with quartzite, limestone, serpentine, and porphyry, containing veins of quartz bearing gold, silver, copper, lead, and antimony. The discovery of silver led to a great influx of population. The site for a large town was surveyed, now called Austin, in north latitude 39° 29′ and 30′, and 117° west longitude from Greenwich. Five years after Austin was an incorporated city, with its mayor, aldermen, police, city hall, daily newspaper, banks, churches, schools, lecture-rooms, comfortable private dwellings with gas and water laid on in every house, which the electric telegraph connects with all parts of the world. And yet in all but the most recent maps this country is marked unexplored.

Professor Silliman, of Yale College, after a careful examination of the region, considered that the abundant stores of wealth buried in the surrounding hills, the almost infinite number of veins of silver, salt, sulphur, iron, and copper, give promise of extraordinary prosperity to the country, which only requires labour and capital to become in a few years one of the wealthiest in the world. The journey from San Francisco to Austin is 473 miles; it occupies four days, and costs fifty dollars. From the east, the traveller leaves the Missouri river by the Pacific Railway, goes through the Bridger Pass of the Rocky Mountains, thence to Salt Lake, to Austin, distant ten days' journey—a route which great bodies of emigrants annually pursue. In a couple of years' time the whole journey will be performed in a few days by rail.

The specimens I have from Nevada consist of a quartz, intermixed with a large quantity of horne silver, the *horne silber* of the Germans. It is a chloride of silver, and rich specimens are from the Transylvania mine, Belmont Company, and assay to £559 a ton. This wonderfully rich ore is widely distributed and abundant. The ruby silver ore, which I also have, is a compound of sulphuret of

antimony and horne silver, rather scarcer, but still very profitable to work. Another ore is of a fine olive-green colour, from the presence of carbonate of copper, which is here combined with the horne or chloride of silver; it is a new mineral, and is called Stetefieldtite. In one beautiful and very rare specimen I have, spots of carbonate of copper of an apple-green colour are seen on the white quartz, but even this I am told contains some silver. In a larger specimen, copper pyrites, argentiferous galena, and horne silver are combined. The "surface ore" shows some finely-coloured carbonate of copper and horne silver. The argentiferous galena assays to £20 a ton. The amalgamation process is pursued for extracting the gold which has been found in one district in Nevada. A red copper ore, oxide and native copper, combined with, I think, sulphuret of antimony, is abundant on the Battle Mountain district of Nevada, but it has not as yet been worked. The quantity of chloride of silver found in this region is interesting, in connection with the abundance of rock-salt, which affords a clue to its formation; for metallic silver (also found here) is corroded and reduced to a state of chloride by contact with salt. Chloride of silver abounded in the Middle Ages in Saxony, but the mines were exhausted, and it became one of the scarcer ores. In conclusion, let me remark that this region appears to afford good prospects to miners, labourers, and speculators. The ground is public. Any man by finding gold, silver, or other ores, can make the ground on which they are found his own, in fee simple. The mines of the precious metals in Europe are royal prerogatives; but here the humblest citizen may possess them.

C. O. G. NAPIER, F.G.S.

ASTRANTIA MAJOR.

IT is of some importance, I think, in the case of very local plants, either natives of Britain, or so long established at certain places as to become permanently naturalized, that the spots where they are found should be distinctly and correctly described; and also that occasionally competent botanists should report upon the plants thus circumstanced. I find the *Astrantia major* is only mentioned in our Floras as occurring in two places in England, and one of these is, I believe, erroneous. The place that is fully authenticated, though not quite sufficiently marked out for a wandering botanist to find, is "above Stokesay Castle, near Ludlow." This is Professor Babington's notice in his "Manual of Botany;" and he further says that "in the latter place Mr. Borrer considered it to have been introduced 'ages ago.'" This is rather vague, especially as to the "ages;" for if really at the place indicated in ancient British times, it has better claim to nativity than several other presumed native plants that pass muster without any dagger (†) affixed to their names.

But I mean only now to report upon the locality for *Astrantia major*—"above Stokesay Castle," with which castle it has in fact nothing to do, except being on a hill full one mile and a half from the castle. The Worcestershire Naturalists' Club had a meeting in July last, at the Craven Arms Station of the Hereford and Shrewsbury Railway, not far from Stokesay Castle, and I took the opportunity of paying a visit to the *Astrantia*. The plant would scarcely have been found but for the aid of the Rev. J. W. La Touche, incumbent of Stokesay, who was, of course, familiar with the vicinity. The plant really grows within a wood near the summit of a rugged hill capped by Aymestry limestone, called the View Edge, from which, indeed, there is a splendid view of numerous broken and lofty Salopian hills. There was at this time a considerable quantity of the *Astrantia major* just coming into flower, and growing dispersed among brambles and rising underwood. The wood had been lately felled, and the underwood now growing up rather choked the plant, which in several places was drawn up very tall. Mr. La Touche said that the plant was in greater quantity before the felling of the trees, but there was quite sufficient now to give support to the idea of the plant being really indigenous here, and that this was a favoured locality for the *Astrantia*, as is the case with the *Potentilla rupestris*, only known to grow in Britain, on Craig Breidden, Montgomeryshire, and *Cotoneaster vulgaris*, on the rocks of the Orme's Head, in North Wales. Opinions may differ, but Mr. Borrer's inquiries led him to believe that the *Astrantia* had been here for "ages," and the purposed introduction of the plant within a natural wood for no useful purpose seems a very doubtful proposition—unless it could be shown that the *Astrantia* had been planted in other places.

My friend Mr. La Touche, who favours Mr. Borrer's idea, and supposes that the *Astrantia* was brought here by the Romans, puts the matter thus:—On the very summit of the View Edge, above the wood where the plant grows, is a quarry of the Aymestry limestone, which abounds with a particular shell, and has been worked, it is believed, many centuries. Some six or eight miles away, the relics of a Roman villa were discovered a few years ago, and among its stones or mortar the shells of the Aymestry limestone were identified, from whence it was inferred that this View Edge quarry had been worked by the Romans, some of whom had brought the plant here. Even if the Roman villa had been found close at hand, instead of eight miles off, it seems unlikely that the *Astrantia* should have been planted here, and got into the wood from a Roman garden, flourishing there thenceforth to the present day; but that labourers

of that period working at a quarry should have brought such a plant with them is quite incredible. Here is no camp, no habitations, and nothing to indicate that any garden was here even in mediæval times. The *Astrantia major* grows on moderate elevations in Switzerland, and this looks as natural a position for the plant as any Swiss locality; and from my examination of the spot, I am bound to say that I think it more likely that the *Astrantia* owes its position here to nature rather than to man. Any way, it is acknowledged to have been an inhabitant of the rugged hill called the "View Edge" for "ages," and here it still exists in considerable quantity among the rising brambles and bushes under the summit of the hill, and I trust will long remain an adornment of the spot to tempt an excursion by the exploring botanist. The other locality mentioned by Mr. Babington is, I fear, an error; and, in fact, a duplication of the Shropshire habitat. I have long been a wanderer over the Malvern country, and neither myself nor any other local botanist I am acquainted with ever met with the *Astrantia* in any spot "between Whitborne and Malvern"—rather a wide sweep of country.

Worcester. EDWIN LEES, F.L.S.

SPIDERS.

SOME of my investigations into the anatomy of several species of spiders lead me to conclusions which differ a little from those drawn in Mr. Ponton's interesting article, in the June number of SCIENCE-GOSSIP, on the Alimentary System of a House Spider. First, with regard to the spinnerets, I think the web-secretion is emitted from the tubules at the ends of some of the spinnerets, and at the sides of others, and not from *orifices* in the sides of those organs, as I understand him to say. I think a close examination with high powers, after special preparation of the object, will reveal that some of the apparent *hairs* on those organs are not really such, but slender pipes, if I may so speak. The spinnerets of a spider are always difficult to prepare, and several differently mounted specimens may be necessary to solve doubts. My trials were chiefly upon the common garden spider (*Epeira*), but I have also tried others, and so far as I have experimented I do not think the plan of structure differs materially. I pinch gently the spinnerets of the newly-killed spider to distend them with fluid, and then, with the scissors, snip them off. Next I place them in strong hot caustic potash for a minute or so; then I violently agitate them in a phial of clean water to cleanse and render them transparent; and finally I mount, either dry or in balsam. If dry, I take care to use no pressure, but set them on the slide in position as nearly as possible as in life, to be illuminated by the parabola.

Second, as regards the web, I am sure that when the glutinous fluid leaves the body it is composed of a multitude of fibres. Examination with moderately high powers of the spot, on a piece of glass or the side of a bottle, to which a spider has fixed her thread will demonstrate this to a certainty, and the number of filaments will almost defy computation. They, however, coalesce into one line almost directly afterwards. Now, what is the object of this? It seems to me that the intention is, by exposing a large surface to the air, to facilitate the rapid drying and hardening of the glutinous fluid. Yet I do not doubt that the spider can, and does when so disposed, emit the fluid in such quantities as to form the other description of thread, that studded with viscid globules so well known to almost everybody. Has the reader ever observed an *Epeira* capturing a fly, and wrapping it up in a perfect warp of filaments?

I am a believer in the garden spiders eating their own web, having repeated the experiments so well recorded in SCIENCE-GOSSIP, vol. i., page 36, to my complete satisfaction. I know it is urged that as the spider lives by suction, and the web is a solid, the feat is simply impossible; but I see no reason to doubt that the saliva of the garden spider will instantly dissolve the web. At all events, observation with an opera glass at the shortest distance off possible seemed to tend to this conclusion. Truth is often stranger than fiction.

The preparation of the poison glands of a large house spider is not difficult. With a lancet I cut a *Tegenaria* (*atrica*, I think) behind the eyes, and gently drew the slice away from the cephalothorax. I have no doubt about the poisonous character of the bite of spiders upon insects or upon one another. The other day I enclosed three zebra spiders (*Salticus scenicus*) and a brown ant in a small bottle together. In half an hour they were all dead. No wounds were visible on either, yet I know they fought desperately. Again, I enclosed in a test tube a large gnat and a house spider. The spider, after experiencing some annoyance from the gnat, bit it and retired to the end of the tube. The gnat immediately fell down, and was dead in two minutes. I remember, too, when a child at Gibraltar, a relation was bitten in the arm by a large black spider, which was instantly caught and killed. The symptoms were certainly those of a venomous bite,—swelling of the limb, and inflammation of the part lasting many hours.

If any moderately large spider be confined in a roomy cell with a glass top, a great deal of information may be gained on many of the points I have noted. S. J. M'INTIRE.

NATURE is immovable and yet mobile, that is her eternal charm. Her unwearied activity, her ever shifting phantasmagoria, do not weary, do not disturb; this harmonious motion bears in itself a profound repose.—*Michelet.*

THE LARGE GREEN GRASSHOPPER.

Acrida viridissima.

AMONG the terrestrial creatures now peopling the earth in such vast myriads, none come across our path so often as the grasshoppers. Every tuft of grass seems alive with their curious calls; at every step one seems to hop away from us. And they well repay a short examination, were it only for their varied and lovely colours: some, having their habitation solely in the grass, are of its own green hue, others enlivening the bare chalky slopes are grey, while some again are of a delicate carmine, some

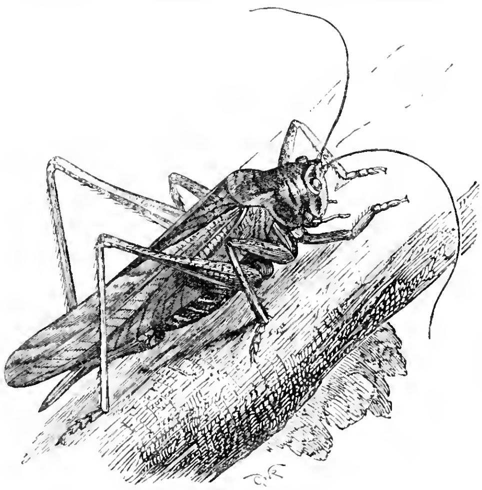

Fig. 198. *Acrida viridissima.*

green and crimson—in fact, as we catch one after another, there seems no end to their tints. The large grasshopper, of which I have made a few notes, is, however, much more seldom seen; when it is caught it is generally killed and pinned out, as something a little out of the common, but very rarely is it kept alive, and consequently little or nothing is known of its habits. My friend Mr. Tate just mentions it in the volume for 1866, and Mrs. Watney also states one fact concerning its food. Were it better known, I suppose we should have a recognized English name for it; as it is, it goes by the name of Green Locust, or the one at the head of this article. But, scientifically, it is neither a locust nor a grasshopper, both of which are included in the family *Locustidæ*, but this belongs to the *Gryllidæ*, which is distinguished from the former—by the presence in the females of a formidable looking ovipositor, extending from the end of the body. Mr. Tate calls it the "Horsehead" Grasshopper; but I do not see why the title should be applied solely to this species, as all of the tribe have heads much alike; perhaps the resemblance to a horse's head is more striking in *viridissima* from its great size.

I caught a female two or three weeks ago as it sat on the head of a large flower, and brought it home captive. It has been living in a glass globe ever since, and at the present moment is doing a constitutional over my writing table; not, I fear, appreciating the honour I am doing it by giving its history in the pages of SCIENCE-GOSSIP; at any rate, it does not look as if it did, being busily engaged in discussing the contents of a cabbage stalk I purposely laid in its way. I did not know at first what food to supply it with, animal or vegetable, until I thought of Mrs. Watney's note above referred to. I put in some grass well moistened, a piece of cooked beef, and, as I knew the latter would not be easily obtained in the creature's own haunts, a couple of house flies as well. It treated both flies and grass with great unconcern; but when one of the *antennæ* came in contact with the meat, it went up to it at once and devoured it, holding it between its two front legs. Shortly after I found that one of the flies was gone, and, as it could not have escaped, I concluded the creature had eaten it, so I sat down to watch the fate of the other. *Viridissima* had retired to the gauze over its dwelling, hanging with its back downwards, and appeared busily engaged in "cleaning its teeth;" but presently the fly came between its legs and the roof, there was a sharp, sudden movement of the head, and the prey was entangled in the complicated jaws of the grasshopper, by the agency of which it was speedily tucked in and devoured. Having once heard of an individual of this species devouring its own leg, which had been accidentally knocked off, I put in a few small grasshoppers, to see whether they formed part of its diet. It was not long before one of them ventured within range, and escaped with the loss of a leg. A few minutes afterwards another was caught bodily, and eaten with great relish. I now fed it entirely with living prey; and though I put in both raw and cooked meat, it never again touched either. I also put in a worm, thinking that probably, like a mole cricket I once kept, it would eat it, but it did not. I should think very probably it would do so, though, if hungry. It is not, however, wholly carnivorous, for, as before mentioned, it is fond of the succulent stalks of cabbage, and possibly of other similar substances.

It never appears to hunt its prey, never ran after the flies or sprang on them; it waited quietly until they came within reach, when it turned its head sharply round and seized them, the legs assisting. It very likely obtains its usual food by lying in wait, as it certainly could not capture either flies or grasshoppers in fair open chase. Its mode of progression appears to be a series of short leaps, on an average twelve to fifteen inches—not nearly so long as those of its smaller relatives, though when jumping from a table or any clevated spot to a lower eminence I have seen it go above a yard. It walks

about a great deal, but I do not think it ever flies; when I threw it into the air it never attempted to do so, it spread out its wings, but merely to break the fall; in fact, it always uses its wings when leaping.

I noticed the frequent application of the tarsi to the mouth when walking; it took place, not only when the animal was climbing up the smooth glass, but in going up a wall or door, and even in walking over the carpet. On the wall it took place about every half-dozen steps, but not so often on the door or carpet, and still less frequently when walking up my coat. I scarcely think with Mr. Tate that by this action the feet are rendered more glutinous, but that it brings them to its mouth simply to cleanse them from any particles of dust that may adhere, by which the action of the pads or suckers may be impeded; as it uses these suckers more in climbing smooth surfaces than in walking, the cleansing would in the former case be necessarily more frequent. Whenever it finds one of its feet slipping about on the wall, it brings it to its mouth and cleans it, after which it adheres very well until clogged again with dust. I noticed especially when it was trying to gain a footing on a dusty ledge above the door, it completely failed, although every foot was repeatedly cleansed. *Viridissima* is very clean in its habits, washing its face with its feet very much as a cat does; it also with its mouth frequently cleans its ovipositor and antennæ, the latter being bent down to the jaws by one of the front legs and drawn upwards with a curve, like that of a carriage-whip. I have been hoping to see it use its curious ovipositor and lay some eggs, but have not hitherto been gratified. The length of my specimen is two inches and three-eighths, the antennæ are two inches, and the hind legs two and a half.

Folkestone. Henry Ullyett.

ON THE STUDY OF BRITISH GRASSES.

It is a well-known fact that the study of British Grasses is much neglected by amateur botanists. The reason for this neglect appears to be a real or supposed difficulty in determining the characters of grasses so as readily to recognize them. There can be little doubt that this is the principal if not the sole cause; for though much may be learned respecting the structure and habits of a plant without knowing its name, yet there must of necessity be a lack of interest unless its name be known; for the chief pleasure of knowledge is derived from communicating it to others, which cannot be done, or only imperfectly, without an acquaintance with names.

Is the study of grasses really so difficult as supposed? I think it will be found it is not. But while young botanists estimate the difficulties of this branch of study far too highly, some botanists on the other hand, whose knowledge of these plants is very great and of long standing, would lead us to suppose that it is an easy matter to find out the genus and species of any grass that may be met with. This is a serious error, which has almost as great a deterring influence as the other—and perhaps acts more injuriously—for it leads the young to distrust their own powers. Nothing can be more injudicious than to represent any branch of science as free from difficulties and easily acquired; for such a course almost invariably prevents the success of all students who have not great faith in their own powers of penetration; for, finding difficulties where they were led to expect none, they are too apt to think the fault lies with them, that the subject is too deep for them, and thus they are led to give up the pursuit in despair.

The true state of the question seems to be this. There are great, in some cases *very great,* though *not insurmountable,* difficulties to be encountered in the study of grasses, but these may all be overcome by *time, patience,* and *application.*

All botanists should attempt to master at least some of the more common and more easily recognized grasses, and they would find that each little victory prepared the way for others—that as their knowledge extended difficulties would vanish—and this branch of their subject would become as easy and as pleasing as that to which they had previously confined their attention.

Grasses, though not bearing showy flowers, are yet very various in form and colour, and present a grandeur of effect from their habit of growing in masses that must ever cause them to rank among the most beautiful of nature's productions. Their utility, independently of their beauty, renders them worthy objects of study for all botanists.

Sweet-scented Vernal Grass (Anthoxanthum odoratum).—This grass blooms at a time when most other grasses are short and inconspicuous, and is doubly welcome on that account. I observed it this year in full flower on the 7th of May. It is easily recognized. Its flowers form a spike-like panicle of from one to two inches in length. The outer glumes are very pointed, the outermost of the two seldom being more than half the length of the other. The longer is from three to four lines. The inner glumes are equal, and are generally included by the outer, though sometimes, as in a specimen now before me, the longer awn protrudes.

"Abundant in Britain, imparting a sweet scent to new-made hay." The odour, however, "is supposed by some to be the cause of that disagreeable disease, hay-fever." It is not very abundant in this locality, though generally occurring in meadows.

The seed (with its inner envelope) of this plant

makes some very curious motions, a short account of which I will transcribe from my journal:—

"The seed, with its inner or flowering glumes, of this plant is highly hygrometric, and when subjected to moisture or, after being moistened, to warmth, exhibits a series of interesting movements which well repay the trouble of examining them.

Fig. 199.

a. Panicle of *Anthoxanthum odoratum.*
b. Inner glumes with awns containing ovary magnified,
c. Inner glumes, ovary removed, magnified.
d. Outer glumes—styles.

"The flowering glumes are awned, the one from the back, below the summit, by a straight and somewhat slender awn; the other from the base by a bent awn, larger and stronger. The glumes themselves are densely covered with stiff brown erect hairs, particularly towards the base, where the hairs are generally spreading somewhat after the style of a cat's whiskers. The larger awn has much the appearance presented by the posterior leg of a grasshopper. Indeed, the movements, general contour, and colouring of the flower form a *tout ensemble* not unlike that of an insect. Both awns, as seen under the microscope or a good magnifier, are closely serrated by stiff spines. I am at present engaged making coloured illustrations of the grasses of my own immediate neighbourhood, and while examining the structure of the flower of this grass I was much struck with its movements. I had laid the flower, divested of its outer glumes, upon the palm of my hand, which was somewhat moist with sweat, and was examining it closely by means of a good lens, when I first observed these movements. First the bent awn began to screw itself round backwards and forwards; then the smaller awn did the same; then again the stronger awn alternately bent and straightened itself in a manner that seemed as determinate and deliberate as though the result of volition.

"The vessel, with its contained ovary, now rolled from side to side, now over and over, and occasionally made small leaps. I now placed it upon a piece of blotting paper, and with the point of my pencil let fall a drop of water upon the paper about four lines from the flower. As soon as the water penetrated to the end of the awn, it jumped fully an inch. This was repeated in the presence of three or four gentlemen with the same result, much to their amusement.

"It is, however, impossible to describe fully the sensitive powers of this flower. Every one may witness them by procuring a few plants.

"I found that on placing it upon damp earth it frequently erected itself upon its base and partially buried itself. Whether this is a provision for the more certain germination of the seeds I can't say, though it seems to me well calculated to produce that result."

The genus *Hordeum* (Barley) contains four British species, all of which are easily recognized as belonging to the genus by any one who knows the cultivated barley; and who does not? Even Miss Kilmansegg, of whom it is said,

> She hated lanes and she hated fields,
> She hated all that the country yields,
> And barely knew turnips from clover,—

even she must have known the "*golden* barley." They are by no means rare plants, two or three species being within easy reach of almost all English and Irish students. In Scotland the barleys seem to be local or rare. They are thus well suited to furnish a lesson on grasses to the tyro in this branch. In this locality I have found three out of the four species—viz., Wall barley (*H. murinum*), meadow barley (*H. pratense*), and seaside barley (*H. maritimum*).

The spikelets in all the species are situated three together, either sessile or nearly so, in alternate notches of the culm or flower-stalk (fig. 200). In *H. sylvaticum* the central spikelets are reduced to a pair of barren glumes, while the lateral ones are perfect. In the remaning three the lateral ones are so reduced, while the central one is perfect.

Fig. 200. Culm.

Hordeum murinum (Wall Barley), fig. 201.—This is a rather stout grass, often geniculate. The leaf sheaths are much inflated. The panicle is longer and stouter than that of *H. pratense*, *H. maritimum*, or *H. sylvaticum*. The awns also are much longer. The central awns are about three times the length of the inner glumes, the exterior awn a little more than half the central

ones (fig. 202). This species may be recognized at once by an inspection of the spikelets. The glumes of the external spikelets are awn-like from the base; those of the central spikelet are lanceolate at the base and fringed with fine hair (fig. 202).

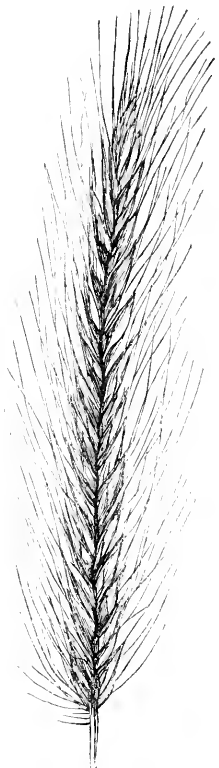

Fig. 201. Wall Barley (*Hordeum murinum*).

Hordeum pratense (Meadow Barley).—This barley is easily distinguished from either of the others. It is much more slender than wall barley, though growing fully as high. The panicle is slender—from one to nearly three inches in length — with short erect awns of a reddish hue, which are shorter than in any other British species. The central awns are about the length of their respective glumes. Those of the external glumes are about equal in length and double the length of the inner glumes of the lateral spikelets.

Hordeum maritimum (Seaside Barley) is a smaller species than either of the preceding, from which it may be known at a glance by its somewhat glaucous hue and its spreading awns, which latter peculiarity gives it a light and feathery appearance (fig. 204).

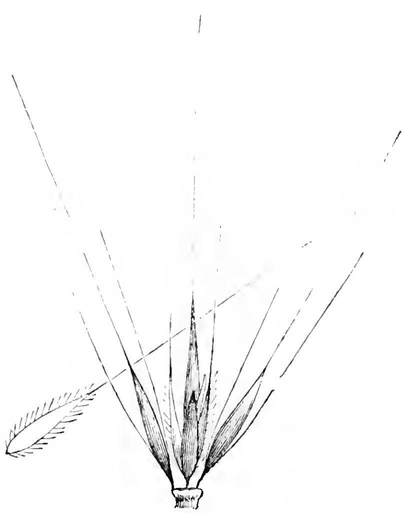

Fig. 202. Glumes and awns of Wall Barley.

The awns are about twice as long as the glumes (fig. 205). The outer glume or awn of the external spikelets has a somewhat broader base than its fellow, the increase in breadth being on one side only. The extended edge has a scarious border. In this and the preceding species the *central* awns of the lateral spikelets are shortest. The awns are very strongly hooked, so much so as, when mixed with hay, to cause much trouble to cattle feeding upon it. This is also the case in the other species, though to a much less extent.

Fig. 203. Meadow Barley (*Hordeum pratense.*)

Lepturus incurvatus (Curved Lepturus), fig. 206. There is a curious little rush-like grass that may occasionally be found on the sea-side, or in the neighbourhood of salt marshes, which is likely to cause some trouble to the finder. I mean the curved lepturus figured on next page.

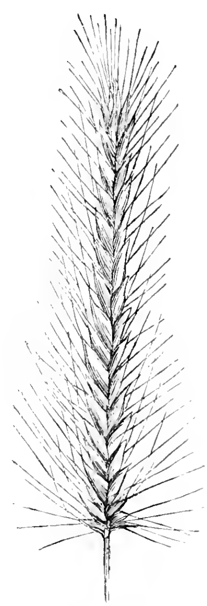

Fig. 204. Seaside Barley (*Hordeum maritimum*).

It is a decumbent plant, much branched from the base with round curved stems, which are deeply

notched on alternate sides. In these notches are placed the sessile flowers—one in each. The outer

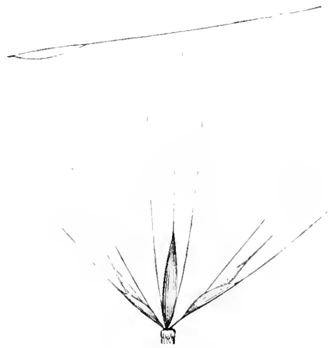

Fig. 205.

glumes are parallel, hard, and stiff, with prominent green ribs. Beneath each flower is a joint, at any

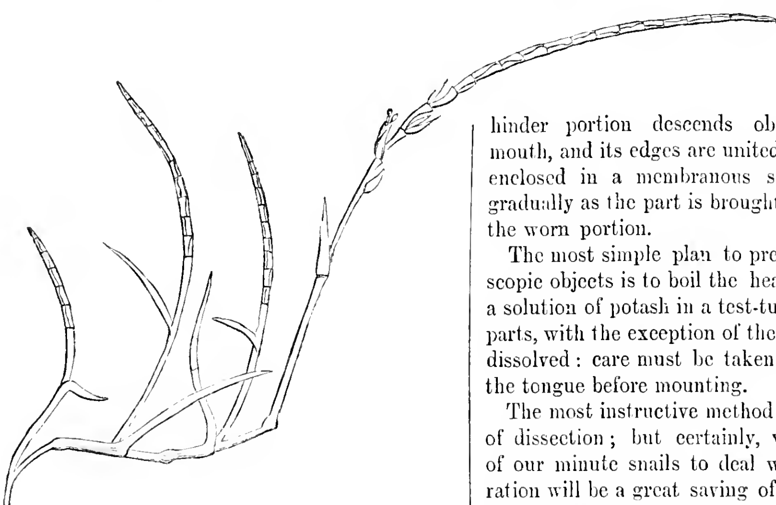

Fig. 206. *Lepturus incurvatus.*

of which the stem readily breaks. Young botanists visiting the sea-side will do well to look out for it. A careful examination will repay the trouble. It occurs in the marshes here somewhat sparingly.

St. Mary's Vale, Chatham. H.

PALATES OF MOLLUSCS.

Land and Fresh-water.

THE mouth in Gastropods is armed with an upper horny jaw, and adherent within the cavity is a horny muscular tongue, which is a mechanical organ for the attrition of the food. This *lingual ribbon* or *tongue*, as it is termed (often, but erroneously, *pallet*), is covered by more or less regular quadrangular plates, carrying erect amber-coloured and glossy teeth of extreme tenuity, which are directed backward. This tongue acts in concert with the horny jaw, the one holding and the other rasping the vegetable food into the mouth.

As the *lingual ribbon* is such a pretty and interesting object for examination with the microscope, and as it plays so important a part in the economy of all snails and slugs, land, fresh-water, and marine, and also because the teeth vary in number, in arrangement, and in ornamentation in the different genera and species, I will now give a method of preparation, and will also point out, in its proper place, the value in a systematic arrangement of the species of these objects.

The tongue forms the floor of the mouth, and the front part, which is the only part in use, is frequently curved or bent quite over, and its teeth are often broken and blunted; the hinder portion descends obliquely behind the mouth, and its edges are united to form a tube, and enclosed in a membranous sheath, which opens gradually as the part is brought forward to replace the worn portion.

The most simple plan to prepare these as microscopic objects is to boil the head of the mollusk in a solution of potash in a test-tube, by which all the parts, with the exception of the tongue and jaw, are dissolved: care must be taken to thoroughly wash the tongue before mounting.

The most instructive method is doubtlessly that of dissection; but certainly, when we have some of our minute snails to deal with, that of maceration will be a great saving of time and patience. The head should be pinned down in a gutta-percha trough containing water enough to cover the part; the floor of the mouth may be laid open by passing the lower point of a pair of scissors into the mouth, and cutting upwards; now pin back the severed portions, and by the aid of a lancet or needle, work out the lingual apparatus. The ribbon should be cleaned by washing with a camel's hair brush, or by soaking in potash-water; if the latter, wash the tongue well before mounting. The preparation may be mounted in *glycerine*, or if intended as an object for the polariscope, it should be mounted in Canada balsam.

The length of the lingual ribbon is short in *Paludina*, but is of varying length for different species; in the marine limpet it is longer than the whole animal. The teeth are distributed in straight longitudinal rows, and in transverse rows, which are

variously curved, angular, or rarely straight. The number of teeth in the transverse row is nearly constant for the same species, and the number of rows is exceedingly variable in different species: longitudinally the teeth are usually arranged in a triple series, and each transverse row is but a repetition of the rest. The central area is called the

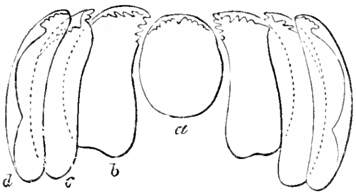

Fig. 207. Teeth of *Paludina vivipara.*

rachis, and the teeth form usually a single series; the lateral areas are called the *pleuræ*, the teeth on which are termed *uncini*, and usually are extremely numerous. The term *laterals* is employed in a restricted sense to designate a series of teeth intermediate between the *rachidian* and the *uncini*.

The lingual ribbon of *Paludina vivipara* consists of a few transverse rows, each composed of a central oval tooth (*a*), slightly hooked and denticulated; and three nearly similar *uncini* (*b*, *c*, *d*), which are oblong and toothed on the upper sides: the number of teeth in each transverse row is therefore seven.

The number and arrangement of the teeth are capable of easy representation by a numerical formula. Thus, 3. 1. 3 represents the system in *Paludina*, signifying that each transverse row consists of one *median* or *rachidian* tooth, flanked on each side by three *uncini*.

In *Vitrina* the general formula is ∞ . 1. ∞ ; where ∞ represents 37; and as there are 100 rows, the lingual teeth of *Vitrina* are, 7,500; the formula will now stand $\frac{37.1.37}{100} = 7{,}500$. In the great slug, *Limax maximus*, there are 28,800 teeth, distributed in 160 rows of 180 teeth in each. The number of teeth has no relation to the size of the animal; thus, *Helicella cellaria* possesses 1,330, while *H. nitidula*, less in size, has nearly three times that number.

The teeth of the fresh-water Gastropods are characterized by their fewness, whilst those of air-breathing snails are remarkable for their extraordinary number.

The lingual ribbon of *Paludinidæ* is very simple, and presents the same general features throughout the family, and places it in close proximity to the Periwinkles and others comprised in the family *Littorinidæ*.

The general formula is 3. 1. 3; the number of transverse rows is very limited.

The lingual ribbon of *Valvata piscinalis* is long; the central tooth (*a*, fig. 208) is subquadrate, with a

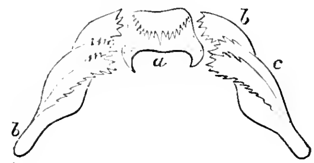

Fig. 208. Teeth of *Valvata piscinalis.*

produced base, hooked and denticulated; the three *uncini* (*b*, *c*, *b*) are lanceolate, and toothed on each side.

The lingual teeth in *Neritina fluviatilis* (fig. 209):—The central tooth (*a*) is minute; the first lateral tooth is large, subtriangular, succeeded by two

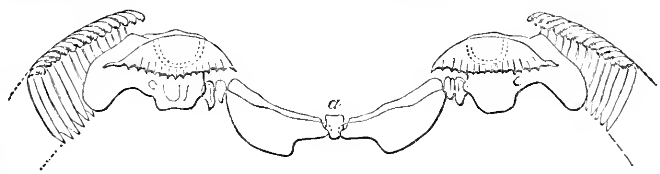

Fig. 209. Teeth of *Neritina fluviatilis.*

very minute ones; the *uncini* are about sixty in number; the first one is very large, and of a remarkable shape; the rest are very slender, hooked, and denticulated.

The teeth of *Assiminia Grayana* are seven in number; the central with a base produced into a horn, with five to seven pointed lobes, the first lateral tooth with seven lobes. The second is slender, claw-like, and serrated; the third is rounded at the tip, with minute denticulations (fig. 210).

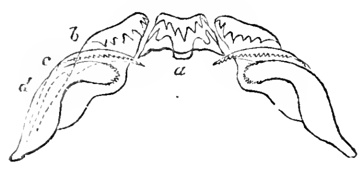

Fig. 210. Teeth of *Assiminia Grayana.*

Testacella, and the other predaceous Pulmoniferæ, do not possess horny jaws. The lingual ribbon is very large and wide, composed of about fifty transverse rows, which are oblique, and descend towards the middle; the teeth are conical, regularly curved, barbed at the point, and having a projection on the middle of the posterior side, from which the remainder thickens; the teeth diminish in size towards the centre; there are 51 in each row.

In *Helicella cellaria* the dental formula is $\frac{17.1.17}{38}$. "The central plate is very long and narrow, with three teeth, occupying nearly the centre of the plate; the first four *laterals* are irregular in shape, apparently bidentated; the *uncini* are long, single, and aculeate" (see fig. 212).

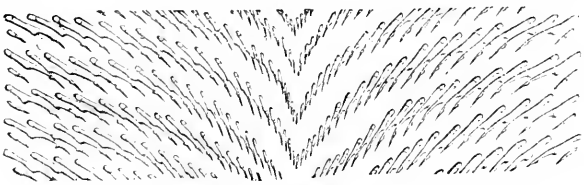

Fig. 211. Part of the lingual ribbon of *Testacella haliotidea.*

The lingual teeth of the "amber snails" are like those of *Helix;* in *Succinea putris*, the formula is $\frac{32.1.32}{50}$; the central tooth differs only from the laterals in size: the teeth are three-lobed, the central is large (fig. 213).

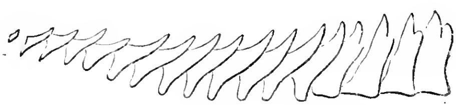

Fig. 212. Part of lingual ribbon of *Helicella cellaria.*

Fig. 213. A transverse row of the lingual ribbon of *Succinea putris.*

The dental formula of *Limnæa stagnalis* is $\frac{55.1.55}{110} = 12{\cdot}210$. The central tooth is very minute; the laterals are large, with two unequal prominent points, the outer the smallest.

In *Ancyclus fluviatilis* the lingual dentition presents the following characters:—The central tooth is minute; the lateral teeth, thirty-seven in number, have long recurved hooks, and are at first simple, but becoming ultimately narrowed and minutely toothed; there are 120 transverse rows.

Fig. 214. Portion of a transverse row of the lingual ribbon of *Ancyclus fluviatilis.*

In the subgeneric group Velletia, *Gray*, the lingual dentition is different, the central part of each row being much arched, and composed of a central tooth, with twelve similar laterals on each side, next to which is a tooth of a different form, and lastly, six more on each side, which latter are in a slight curve; the number of transverse rows is 75; the total number of teeth is 29,215.—*Tate's Mollusks.*

AGE OF TREES.

THE life of a plant is determined by its inner structure, by the laws of its growth, by its power of resisting external injuries, and by other circumstances, many of which are a mystery, and no doubt will ever remain so. But, bounded though it is within limits as narrow and precise as those which hedge round the life of man or the lower animals, there are cases on record of certain members of the vegetable kingdom, whose existence has been prolonged for very extraordinary periods.

The most celebrated of all old trees (and perhaps the most curious, from its belonging to the endogenous division, which does not generally boast of long-lived members) is the Great Dragon-tree of Orotova, in Teneriffe. This monstrous specimen, which came to an untimely end in a hurricane a few months ago, was well known and carefully looked after at the conquest of the island by De Bethencourt in the year 1402. It appears to have been of the same size and appearance then as now—viz., from 70 to 80 feet high, with a hollow trunk of about 20 feet in diameter,—whence, judging from the slowness of growth in this family of plants, and the little change that has taken place in four centuries and a half, it is inferred that the tree could not have been less than 5,000 years old at the time of its death. Another giant among the pigmies of modern days is the Baobab (Adansonia), an African tree, specimens of which, growing on the banks of the Senegal river, 60 to 80 feet high and 30 feet in diameter, were estimated by Adanson to be over 5,000 years old. The Portuguese, on their voyages of discovery, were in the habit of carving their names, &c., on conspicuous trees, as a memorial of their having been the first to visit the spot. Adanson arrived at the age of the trees by comparing the depth of the indentations with the number of "rings" in the portion of wood overgrowing them. The names themselves bore a date, which showed them to have been cut three centuries prior to his visit. It has been suggested that possibly in a tropical climate these rings may not be so good a test of age as in our more temperate clime, where they are really annual. Nevertheless, allowing that the Baobab forms two rings in each year, in lieu of one, it is still deserving of "honourable mention." Yews have a great reputation as long-livers. The care usually taken of them in churchyards and similar places no doubt tends greatly to their preservation. Thus a Yew in the churchyard of Brabourne, in Kent, has, it is believed, reached the enormous age of 3,000 years; another at Fortingal, in Scotland, is quoted at 2,600 years, and others at Crowhurst, in Surrey, and at Fountains Abbey, are put down at 1,400 years. The Yew has

some near relatives in the Cypress, the Taxodium, and the Wellingtonia. Of the first there is a specimen at Grenada, which was a celebrated tree before the Moors were expelled from Spain by Ferdinand and Isabella, towards the end of the fifteenth century. A *Taxodium distichum* at Oaxaca, in Mexico, which in 1829 measured 120 feet in height by 117 in circumference, is supposed to number forty centuries. It sheltered Hernan Cortez and his little band of adventurers under its wide-spreading boughs about the year 1520. Among the gigantic Wellingtonias (or Washingtonias, as our thin-skinned cousins across the Atlantic will persist in calling them, in spite of priority of title),—among these mammoth trees of California, which reach a height of 300 or 400 feet, individuals have been observed which must have witnessed 3,000 summers. Two other American trees, both Brazilian, have been noticed for their size and probably long lease of life. The first is the Bertholetia, which supplies the "Brazil nut" of commerce, specimens of which, growing on the banks of the Amazons, have been noticed with more than 1,000 distinct rings. The other is the Hymenæa, in connection with which I transcribe the following passage from "Lindley's Vegetable Kingdom." The size of the timber is sometimes prodigious. The Locust-trees of the west have long been celebrated for their gigantic stature, and other species are the colossi of South American forests. Martius represents a scene in Brazil, where some trees of this kind occurred of such enormous dimensions that fifteen Indians with outstretched arms could only just embrace one of them. At the bottom they were 84 feet in circumference, and 60 feet where the boles became cylindrical. By counting the concentric rings of such parts as were accessible, he arrived at the conclusion that they were of the age of Homer, and 332 years old in the days of Pythagoras; one estimate indeed reduced their antiquity to 2,052 years, while another carried it up to 4,104; from which he argues that the trees cannot but date far beyond the time of our Saviour. (P. 551, with an illustration.) My remaining examples are European. Among them is a Chestnut-tree growing on Mount Etna, and generally known as *Castagna di cento cavalli*, on account of the immense space which it overshadows. It is 180 feet in circumference, and cannot be less than one thousand years old. A scarcely less celebrated tree is growing at Tortworth, in Gloucestershire. It was a tree "of mark" in the days of King John. The great Lime-tree of Neustadt on the Kocher, in Würtemburg, which as early as 1220 caused the town to be known as *Neustadt an der grossen Linde*, is believed to be not less than 800 years old. Its stem is 38 feet in circumference. At Worms, where there has been lately such a gathering of crowned and ducal heads to do honour to the memory of the great Reformer Luther, is an elm well known in Germany as the Lutherbaum, which measures 116 feet in height, with a stem 35 feet in circumference, and has attained an age of not less than 700 years. A less venerable member of the vegetable kingdom, though still one that can look back through a tolerable vista of years, is a Judas-tree (*Cercis siliquastrum*), in the Botanic Garden at Montpelier; it was planted in 1598, and consequently numbers 270 years. Its trunk a short time ago measured 12 feet round. In Science-Gossip of last year, p. 163, I gave a short account of a rose, which covers one end of the principal church at Hildesheim, in Hanover. This remarkable climber was well known as "a monument of the past" as early as 1054. Tradition assigns its origin to the year 814, under Louis the Pious, son and successor of Charlemagne. Another tree with a legendary history is a "Gospel Oak" in my own neighbourhood in Hampshire, standing in Avington Park. If we are to believe the stories told of it, and common there in every one's mouth, this "old, old tree" was spared, at the earnest intercession of certain monks residing at Winchester, solely on account of its great age, when a brother of William the Conqueror levelled the whole of the surrounding forest of Hampage, about A.D. 1076. For some sixteen centuries, therefore, it has defied the storms of winter; but the latter have conquered at last. Ten years ago the old veteran made a final struggle to show some signs of life; and now it stands a hollow trunk, with two or three bare and withered arms, and only prevented from falling by a stout band of iron, with which it is encircled. A mere infant by the side of the Avington tree is the Great Oak of Pleischwitz, near Breslau, whose age is reckoned by Göppert at 700 years. It was blown down in 1857; its fall being due to a hollow within its huge stem, which could accommodate with ease twenty-five or thirty persons standing upright.

Dr. A. B. Reichenbach, in his "Vollständige Naturgeschichte," says, "We know of Limes in Lithuania with 815 annual rings, and a circumference of 82 feet; of Oaks in the Polish forests in which one can count 710 perfect rings, and whose stems measure 49 feet round. There are Elms whose age is known to be above 350 years, Ivy 440, Maples 516, Larch 570, Oranges 640, Planes 720, Cedars 800, Walnut 900, Limes 1,000, Pines 1,200, Oaks 1,400, Olives 2,000." From these numerous examples of extreme old age one may almost conclude that (provided the seed from which they spring be sound, the soil and climate favourable, and the means of nourishment abundant) the existence of many plants may be extended to an indefinite period, should they be fortunate enough to escape accidents from without.

Clifton. W. W. Spicer.

THE COMMON KINGFISHER.

(*Alcedo ispida.*)

THE Kingfishers form one of the most natural and beautiful families of birds, and from their varied character are most interesting to study.

In a truly natural family like the Kingfishers, where the beak is the principal agent in procuring food, it would be expected that a modification of that organ would be accompanied by a corresponding modification of habits. Such is the case, and the modifications of the form of bill can be traced from the highly-compressed bill of *Ceryle* or *Alcedo*, through the different genera of the *Halcyoninæ*, to the short, depressed bill of the lizard-eating *Dacelo-ninæ*, the extreme development being reached in *Melidora*, where the bill is notched and hooked. So gradual, indeed, are these modifications that it is by no means easy to define clearly the limits of the several sub-families, the habits being, I think, the best guide to a definite arrangement.

The genus *Alcedo*, of which our English Kingfisher is the type, is widely distributed, being represented in the Palæarctic, Æthiopian, Indian, and Australian regions, the only species in the latter being *Alcedo moluccensis*, which is found in Celebes, and in some of the other islands of the Austro-Malayan sub-region.

The numerous excellent essays which have appeared from time to time on the English Kingfisher leave little new to be added. To the scientific ornithologist the short but interesting paper by the Baron R. König-Warthausen * will be found of service, while among the works of British ornithologists no more interesting memoirs can be met with than those of the celebrated Mr. Charles Waterton † and Mr. Stevenson.‡ I have few remarks to add to the excellent histories of the Kingfisher given by these gentlemen, but I find I am able to confirm some of their observations from a personal study of the bird's habits. I have before referred to the obligations I owe to Mr. Briggs, of Formosa. He tells me that from his cottage window he has seen Kingfishers perch on the boughs overhanging a small pond immediately opposite, and has watched them with interest. He has sometimes seen them dive five or six times in succession without bringing up a fish, and I myself was once witness of one dashing backwards and forwards without intermission into the water of a small brook. In writing on this occurrence elsewhere I suggested that these frequent divings of the

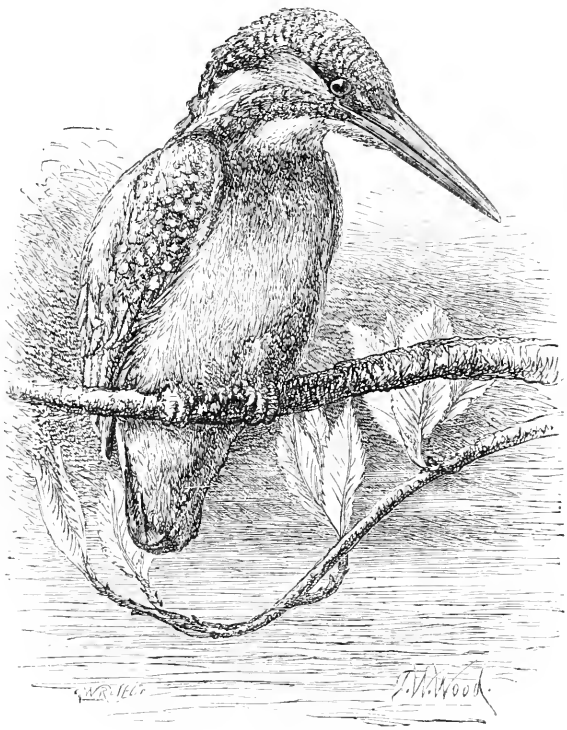

Fig. 215. THE COMMON KINGFISHER.

* Naumannia, 1854, p. 160.

† Essays on Natural History, First Series, p. 166 (1844).

‡ Birds of Norfolk, i. p. 314 (1867).

Kingfisher might be for the purpose of troubling the water, in order to attract the fish to the spot, as we all know the way in which the latter assemble at any place where the water has been recently disturbed. Since writing the above opinion it has occurred to me that the bird may occasionally feed on water-insects, which it may have been diving after when noticed by Mr. Briggs and myself. Mr. Waterton states that in his experience the present species always feed on fish, and he has never found them feeding on anything else; but I know that the allied species of the genera *Ceryle, Corythornis,* and *Alcyone* do occasionally feed on water-insects, and Mr. Stevenson says, in speaking of a nest, "Amongst the half-digested portions of bone I particularly noticed the remains of beetle-cases, and one large fragment of a water-beetle (*Notonecta*) with the claws complete." The food of the Kingfisher is a subject worthy the attention of naturalists, as also are the following questions which have been raised:—1. Is the female larger than the male? 2. Is the red mark on the under mandible a true sign whereby the female can be distinguished? I shall be glad to receive notes on this subject from ornithologists who have the opportunity of personal observation and examination. Unfortunately the Kingfisher is becoming scarcer and scarcer. On the Thames, near Cookham, it is nearly extinct, where it used to be very common. Much of this extermination is due to the persecution the poor birds are subjected to at the hands of those gentlemen who delight in trout-hatching. Near Cookham a noble lord has taken to preserve the fish, and as the Kingfishers evinced too great a partiality for the young fry, they were shot down right and left. Thirteen were killed by the fisherman in charge of the preserves in one week. "There," said he, as he brought two mutilated bodies, all shot to pieces with large shot, to Mr. Briggs, "I reckon I've got them nearly all now. There's only one more, and I shall get him soon." These two unfortunate victims are now in my collection. They were both males, and I suspect the females were sitting at the time. I only found one nest this year, which I did not take, much as I want to examine one personally, a pleasure I have never yet met with.

There is much in the economy of the English Kingfisher still to be worked at, and I hope these few lines, in which only a hasty review of the subject can be taken, may induce some of my readers to interest themselves in the study and protection of this most beautiful bird. I may, perhaps, be permitted to add that any original communications will be very thankfully received by me, as I wish to make my notice of it in my "Monograph of the *Alcedinidæ*" as complete as possible. All letters addressed to the care of "The Editor" will reach me safely.

R. B. Sharpe.

THE SAND WASP.

(*Odynerus parietum.*)

A very small wasp, not larger than a house-fly, but in form and colour much resembling the common wasp, occasionally visits the shrubs in my garden, hovering over and delicately alighting on the leaves, as if in search of honey-dew. It may be so, but an examination of the formidable weapons it carries suggests the thought of other possible pur-

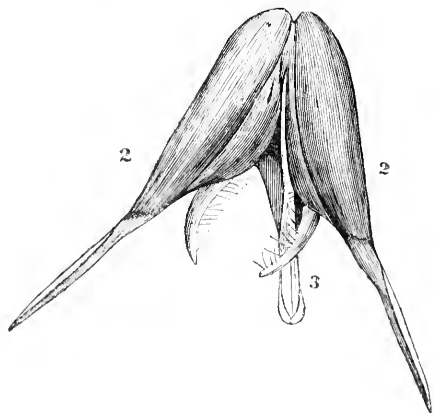

Fig. 216. 1. Sting; 2. Tube; 3. Sheath; × 20.

poses. Its sting presents so remarkable a modification of the parts lately described by Mr. Mills in

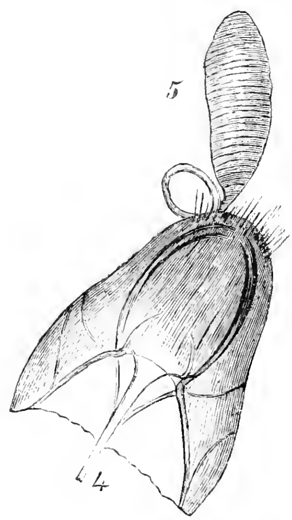

Fig. 217. 4. Poison tube; 5. Poison bag, × 20.

his able and elaborate paper that it may be especially interesting just now to point them out. The sting in both this and the common wasp is double; but in the instance of my little visitor they are placed in separate tubes, diverging from each other like the prongs of a trident, the third being

represented by a poison-tube between the other two. The sting is unbarbed, and in shape like the blade of a narrow, straight-pointed penknife, one exquisitely keen edge of which projects on the outside of each tube, cut away for that purpose; the point can also no doubt be thrust beyond the end. It is made up of two very thin plates of a horny substance, united at their edges, the delicate suture so formed on the outer or cutting side serving to strengthen the edge, while that at the back, which is thicker, fits into a groove made for it in the strong keeled bar below, in which it has a sliding motion. This bar again fits into a corresponding groove in the tube itself, in which it is moved backwards and forwards by the powerful muscles lining the upper part of the tube. These stings seem fitted rather for cutting and wounding than for killing, and, having no barbs, can be used without danger to the insect itself. The poison-tube, which has a separate sheath, is fixed as stated, between the sting-tubes. It has been removed in the illustration from its true place, where it would scarcely be visible. The poison-bag is similar in form to that of the common wasp, and is provided with two sets of muscular bands for contracting it rapidly—one around the smaller circumference, as drawn in the figure, the other underneath and across these.

When confined in the live-box, the wasp darts out its stings with great vivacity, first on one side, then on the other, together with the poison-tube, which gives out a fluid poison in visible quantity. The abdomen at the same time is much prolonged, and is capable, no doubt, of bending well under the

Fig. 218. Claw of Sand Wasp, × 50.

body between the claws. These, as in many, if not all wasps, are prehensile, furnished with two claws for digging; each is hollowed out behind, and a smaller tooth fitted into the cavity, which can be closed or extended, making a pair of pincers. Thus there are twelve pairs of pincers to hold the prey whilst under the command of the formidable stings and poison-tube. The foremost leg is furnished with a pecten to brush the antennæ, indicating a habit of burrowing in the ground or in rotten wood.

Without knowing more than can be gathered from its equipments, it may be surmised that this insect is one, among many species, of those predaceous little tyrants called Sand or Wood Wasps which carry off unhappy caterpillars and insects, and shut them up with their eggs, in a crippled and stupefied state, as a provision for their future grubs. A summary account of them is given in Wood's "Natural History." No mention is made of the peculiar form of sting now brought under notice. It would probably, however, be found, on a wider investigation, that this is by no means a solitary instance, and that in many cases the sting is similarly modified to suit the habits of these very curious wasps. S. S.

THE GREEN TREE FROG.

(*Rana arborea.*)

IN the December number of the first volume of SCIENCE-GOSSIP, G. Guyon remarks that, although he had often seen toads and natterjacks strike at each other, and at inanimate objects, he had never seen the green frog commit mistakes of a similar nature.

Having kept a couple of these pretty reptiles last summer, I have had many opportunities of watching their habits, and have often seen them jump at a piece of stick, a pencil, or my fingers, which habit may be accounted for by their usually being fed in one or the other of these ways. It may therefore be presumed that they would not commit such mistakes in a wild state; if they do, very disagreeable results must often follow. I certainly do agree with your correspondent as to their always being on the look-out for food. I think that, comparatively, they eat more than most reptiles. Mine would at one meal eat, and apparently think nothing of, two or three large blowflies, half a dozen houseflies, a few winged ants, and a drone or two. They can, however, like most reptiles, exist a long time without food.

When the green frog gets a morsel that is difficult to manage—for instance, a large garden spider, of which mine were remarkably fond—it makes use of its fore-paws, pushing the insect to the front of its mouth, where it can be more easily dealt with. Its food consists of all kinds of spiders, flies, white slugs, small earthworms, and on one occasion mine eat a few pieces of raw lights. Whilst feeding, two of my frogs often sprang at the same object, the successful one getting, as "C. A." remarks, "a smartish smack on the side of the head" from the tongue of the unsuccessful one—of course not intended for the frog, but for the insect.

The agility of the green frog is surprising, particularly when hungry; it will leap two or three

feet, and catch the fly on or at the end of the journey.

The colour frequently changes to the predominating colour of the surrounding objects, and to all appearances involuntarily. I have seen my frogs become, after resting for about an hour on the mahogany back of the case in which they were confined, as regards colour, a perfect counterpart of the wood on which they rested; their return to their natural colour, however, takes considerably less time. They will sometimes change their usual bright green coat for one of a very dark colour while resting upon a fresh and green leaf. I can see no cause for this phenomenon, and leave it to be explained by some correspondent more learned than myself.

Clapham. H. ALLIOTT.

MOSQUITOES.

SCEPTICAL on the subject of Mosquitoes in England, we sent to Woolwich for some of the "foreigners" declared to be so plentiful there, and received specimens. Still sceptical, we sent them to an authority of scientific repute for their

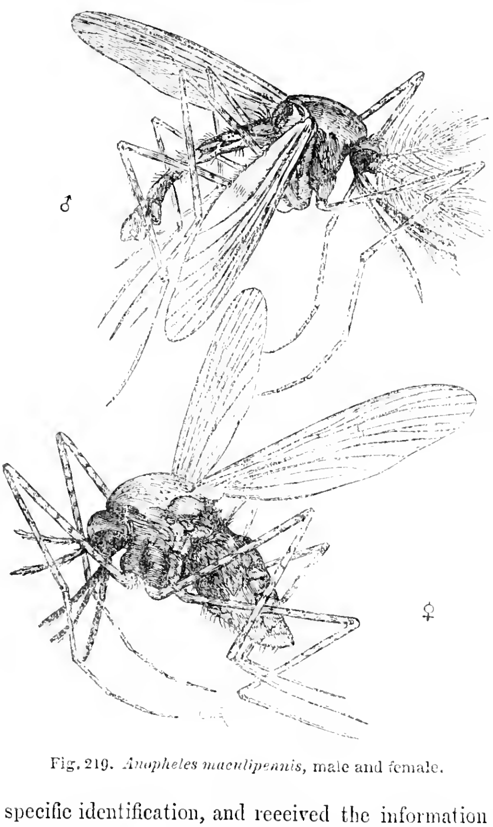

Fig. 219. *Anopheles maculipennis*, male and female.

specific identification, and received the information that they were only a species of gnat (*Anopheles maculipennis*), previously known as British, and of which we figure the male and female, drawn from the Woolwich specimens. So far the evidence breaks down, and we are still sceptical about "Mosquitoes in England." A notice by Professor Westwood in the *Gardener's Chronicle* of August 8th favours this scepticism, and is to the following effect:—

My opinion having been requested on the subject of the mosquitoes, said to have been introduced into this country from the West Indies during the present hot weather, I am under the necessity of saying that I entirely discredit any such occurrence having taken place. Every year in the hottest part of the summer our common gnat (*Culex pipiens*) is developed very numerously and very rapidly, and no sooner does it make its appearance in the winged state than it (or, rather, only the females) immediately wants food, attacking the exposed parts of the body, especially during the night, with the greatest violence. We possess a score British species of the restricted genus *Culex*, one of which, with spotted wings, has just been sent to me from Portsmouth as a mosquito; and I fortunately happened to be at the British Museum when a "mosquito" was brought from the neighbourhood of Woolwich, which proved to be nothing but *Culex pipiens*. The Mosquito of the Riviera, between Nice and Genoa (which is very venomous, and is guarded against by carefully stitched mosquito curtains), is certainly only a culex, which breeds in the open water-tanks in the garden or yard of every house, and which is not only never cleared out, but always left open, so that the gnats breed in the water perfectly unchecked. There is a minute midge, of quite a different genus, which is called a mosquito in some exotic parts, as in North America, and we have small British species which go under the common name of Sand Flies (a great misnomer, as they are chiefly found in swampy places only) which draw blood. That the insects are more venomous now than at any other season I do not believe; that the hot weather makes them more energetic I do believe; and that many persons when stung are in an inflammatory condition will, I believe, sufficiently account for the worse effects of the insect's wound. If persons who have water-tanks or open ditches about their houses would be careful shortly after sunset to watch the windows of their bedrooms, they would find the gnats beginning to fly about the panes of glass, emitting their hum, and a little pains would enable them to destroy the enemy, and ensure a quiet night's rest.—*J. O. Westwood, Oxford.*

In a previous number of this journal (1867, p. 78) we gave an interesting chapter on mosquitoes by Mr. J. K. Lord, illustrated by figures of male and female mosquitoes from India, to which we refer our readers.

ZOOLOGY.

A Retired Eagle.—Near Havre I have observed one instance of truly royal nobility, and, above all, of sobriety, in an eagle. A bird captured at sea, but which has fallen into far too kindly hands in a butcher's house, is so gorged with an abundance of food obtained without fighting that he appears to regret nothing. A Falstaff of an eagle, he grows fat, and cares no longer for the chase or the plains of heaven. If he no longer fixedly eyes the sun, he watches the kitchen, and for a titbit allows the children to drag him by the tail.—*Michelet's "Bird."*

The Crow.—I saw one daily in the streets of Nantes, on the threshold of an alley, which, in his demi-captivity, could only console himself for his clipped wings by playing tricks with the dogs. He suffered the curs to pass unmolested; but when his malicious eye espied a dog of handsome figure, worthy indeed of his courage, he hopped behind him, and by a skilful and unperceived manœuvre leapt upon his back, gave him, hot and dry, two stabs with his strong black beak: the dog fled, howling. Satisfied, tranquil, and serious, the crow returned to his post, and one could never have supposed that so grim-looking a fellow had just indulged in such an escapade.—*Michelet's "Bird."*

Fecundity of the Queen Bee.—According to the experience of the learned German apiarian Dzierzon, the average duration of life in the queen is four years, and that a prolific queen lays not less than 1,000,000 eggs; and this opinion is endorsed by the Devonshire bee-keeper. He further informs us that it is nothing unusual to see from 15,000 to 20,000 cells occupied by brood during three months of the year. Then we are to add to this period the spring and autumn months, when breeding takes place; during the first in an increasing ratio, and during the latter in a decreasing ratio; until, in October or November, it entirely ceases. Then we are to consider that, during this period, the tenants of the brood-cells are removed every three weeks. From this calculation we are enabled to form some idea of the fecundity of a prolific queen.—*Fred. Smith, in Ent. Monthly Mag.*

Snake in London.—A short time back one of the workmen of W. H. Burke & Co., sculptors and marble masons, 17, Newman Street, Oxford Street, reported, with much alarm, that he had seen a large snake in the front slab yard. He was at first disbelieved, but the affrighted appearance of the man got him a hearing. A hunt for the snake commenced amongst the marble slabs, and continued for some time without success, but at length it was seen to shoot across the yard, enter the stock room, and disappear down a hole in the floor. The men went to dinner, leaving a sentry to watch the hole, anticipating the snake would return when all was quiet, which proved to be the case, for in about an hour it was seen to move very cautiously until it got into the sun, where it lay basking, watched by the sentry, anxiously awaiting the return of the men to ensure its capture. To effect this was at the moment rather a difficult and dangerous proceeding, not knowing the species of snake they were dealing with: it was thought venomous, and kept raising its head and showing its fangs as if in defiance. However, its capture was accomplished by one of the men dexterously placing the end of a long straight-edge or flat ruler over its body, and so holding it firmly to the ground until secured in a bag, and finally placed in a large empty aquarium, one of the men acting as keeper. The question of food was discussed, and frogs were proposed as a trial. Two were procured from the Highgate ponds the next day and put in beside the snake, and were as speedily dispatched without much ceremony. The snake measures 42 inches long, and is now alive and healthy, having cast its skin last week. To account for its appearance in such a locality, and in the centre of London, has caused many conjectures and makes it worthy of note.—*Robert Davison.*

[We have seen the reptile, and it is the common snake *Tropidonotus natrix*.—Ed.]

Hawk-Moth.—On the 6th of this month I found a fine larva of the Privet Hawk-Moth at Clifton, Bristol, feeding on the leaves of a variegated holly, very prickly. There was no plant of its usual food near, so that the egg must have been laid by the moth on the holly-bush. This is the only instance in my experience of the larva of a spinx feeding on the holly. The finest specimen of the larva of the Eyed Hawk-Moth which I ever took I found on a common laurel.—*E. S.*

The Starling.—On the 4th of August, at seven o'clock in the evening, I was struck at witnessing several score of starlings making an awkward attempt at hawking for insects; so much so that I observed that these birds were trying to imitate the swallows, which were also on the wing for insects. The air was full of flies, and having watched the birds with a binocular, I was led to conclude that they were seeking food in this unusual manner, as from the parched state of the meadows in this season of drought their usual food must have been difficult to obtain. Be this as it may, I have not observed the like action since. It continued for about an hour, and I was interested in watching such ungainly birds trying to vie with the truly graceful swallow in his own element. I should have had one shot to examine the contents of the stomach, but that they are such favourites, and as insect-destroyers on the ground they are among some of our most useful helpmates.—*J. E., Bradford Abbas.*

Man and Animals.—The principle that man is the type of creation is as applicable to geography as zoology. Races in their centres show qualities in harmony with climatic, botanical, zoological, geographical, and geological surroundings. Thus, the man of the locality is its key and its epitome. Mountains and rivers, by their elevation, course and direction, illustrate the history, character and migration of races; as do deserts, steppes, llanos, national or racial character and habits. Thus the inhabitants of mountainous districts are distinguished for loftiness of spirit and love of freedom. The inhabitants of steppes are democratic rather than aristocratic; whose tendency is to look up to chiefs as to a mountain peak. Nations temperate in passions—that is, those under the strictest moral government—reside mostly in temperate regions. The rainfall of countries typifies the degree of their moral and spiritual advantages, the belongings of each centre being considered. The animals and plants of different regions of the earth illustrate, we have said, the character of the nations. Australia has the most debased fauna for so large a country; in harmony with its human population. The animals and plants of America are less vigorous than those of the eastern hemisphere; in harmony with the comparative inferiority of its aboriginal men; thus the bats, the puma, jaguar, lama, tapir, bison, opossum, alligator, rhea, and turkey, are smaller or less vigorous than the bats of Madagascar, the lion, tiger, camel, elephant, African buffalo, kangaroo, crocodile, ostrich, and bustard.—*Groom-Napier's "Miscellanea Anthropologica."*

Water Boatman.—I am able to corroborate the letter of Mr. Watson, in your May number, regarding the Water Boatman (*Notonecta? glauca*). I have kept numbers of these creatures to watch their curious habits, and have frequently, without any possibility of doubt, heard them utter a loud and shrill cry. I do not, however, think that I have noticed it at any other time than after dark in the evening.—*Edward Banks, Tettenhall, near Wolverhampton.*

Large Cabbage Butterfly.—As a supplement to the remarks of "J. B." in your August number, on the abundance this year of *Pieris brassicæ*, I may observe that the common Nasturtium, *Tropæolum majus*, in my garden, is at the present moment swarming with the larvæ of that *Lepidopterous* pest. Although aware that this food-plant has been previously recorded for the large white (Stainton, 'Manual') I have never happened to observe it being devoured by that insect before this year. I presume that the larvæ find the acrid flavour and odour of the plant as satisfactory as that of their accustomed Cruciferous *pabulum*: they are, doubtless, unaware that *Tropæolum* belongs to the *Balsaminaceæ*. In the same garden, and on the same plant, I have found the rare *Ceuthorhynchus rapæ*, Gyll. (*inaffectatus*, Walton); which, in spite of its cabbage-wards pointing specific name, has hitherto occurred with us (as far as I am aware), only on the cruciferous *Sisymbrium officinale*. Thus it is clear that the Botanical education of the *Coleoptera* is occasionally neglected, as well as that of the *Lepidoptera*.—*E. C. Rye, 7, Park Field, Putney, S.W.*

Cabbage Butterfly.—I have noticed during the past week a very extraordinary abundance of the cabbage butterfly, *Pieris brassicæ*, and this has been remarked over a very considerable tract of country in East Cornwall. A farmer, living at a distance of nine miles from me, likened their number to a swarm of bees. In the course of a drive of a quarter of a mile I counted eighty-nine individuals, and I believe many escaped observation. On another occasion I took notice, on close search, that there was an immense preponderance of females as marked by the bimaculated anterior wing. Has this been observed elsewhere? and what can be the cause? Happily there are no sparrow clubs in this neighbouhood.—*T. Q. Couch, Bodmin, Cornwall,*

Robins.—The robin seen by "J. H." must have been a fireside robin. All things were early this spring and summer. I believe some of our birds began to build their nests in advance of the usual time, and a young robin hatched this spring would not have the bright red waistcoat worn by his papa, when he visits us in winter—

> Enters as a looked-for guest,
> Confiding in his ruddy breast,
> As if it were a natural shield
> Charged with a blazon in the field,
> Due to that good and pious deed
> Of which we in the ballad read.

A young robin came to visit me yesterday. I was writing at my desk-table, thinking, and taking but little heed of what was passing in the room, when I felt something touch my head, and on putting up my hand it came in contact, to my great surprise, with the feathers of a bird. The poor frightened little thing flew off into the greenhouse, through the doorway by which it must have at first entered the room. It was a young robin, in very linnet-like dress. Can any reader of Science-Gossip expound omens? My cook—the only person who was in the house at the time—evidently considered it "a sign." A sign that the bird had been chased by a cat I should say, only I could not see puss anywhere near.—*Mrs. Alfred Watney, Hambledon.*

Furze Mites.—The furze here is covered with little red mites living under a sort of web.—*W. F. H., Tunbridge Wells.*

BOTANY.

Abnormal Foxglove.—A correspondent has furnished us with what at first sight might pass for a small bunch of hops, but which a closer inspection shows to be a portion of the infloresence of *Digitalis purpurea* so much disguised that its identity might fairly be questioned by any one who had not seen the plant itself. As far as we can make out from the small portion sent us for examination, the flower is replaced by a small branch thickly beset with green tracts arranged spirally and quite similar to those found on the normal plants. This branch at its upper extremity divides into ten or a dozen divisions, each clothed like the primary branch with green tracts. These clusters of tracts resemble hops as aforesaid. Quite in the centre of each cluster is an imperfect ovary, with indications of styles and of ovules, but there are no traces of any other part of the flower. This replacement of the flower by a branched axis bearing green scales or imperfect leaves is not of very uncommon occurrence. In the garden pea, in some willows, plantains, and other plants, a similar change occasionally is met with, but we do not remember to have seen it before in *Digitalis*.—*M. T. M.*

Oxalis.—Surely the plant mentioned by "B." in Science-Gossip is the oxalis which once upon a time was known by the long sounding title of "*Oxalis Corniculata atro-purpurea*." All the oxalis close their flowers when the sun sets. The common, but uncommonly pretty little plant, wood sorrel, is one of the genus—a British cousin of the more brilliantly-coloured natives of the Tropics. The *Oxalis crenata* we get from Peru. The ladies out at Lima are so fond of its acid leaves that they cultivate it largely in their gardens. It produces a tuber not unlike a small potato in appearance, but very inferior to that vegetable in taste. The flowers are exceedingly fine—bright yellow streaked with purple—and many of our gardeners consider it the best spring bloomer of all the kinds yet introduced into England. I planted some of the wood sorrel (*Oxalis acetosella*) in amongst my ferns in a *cold* greenhouse, together with the woodruff and the wood anemone, last year, and they well rewarded me for my trouble this spring. All three wild flowers were much improved by shelter. I wonder why the monks called the wood sorrel "*Alleluia*."—*Mrs. Alfred Watney.*

Lemna gibba.—This plant is to be found in the *ditches* with which the marshes near the mouth of the Avon abound, and which are more or less stagnant, but by no means half-putrid. I find it also quite as abundantly in a *stream* which turns a flour-mill, about two miles from Devizes. The current, though slow, must be constantly on the move from the action of the mill-wheel.—*W. W. Spicer, Clifton.*

Lythrum hyssopifolium in Prestwich.—It may be interesting to some of your Manchester readers to learn that so rare a plant is occasionally found in this neighbourhood. I observed it first in the early part of August, 1867, and again on the 24th of July last, in a place about a mile from where I found it on the first occasion. I should be very glad if any of your readers would be kind enough to inform me whether it is common, either indigenous or otherwise, in any part of England, as it is almost entirely unknown in this locality, and I cannot conjecture from what source we have received this addition to our local flora.—*S. S.*

Origin of the Tea-plant.—The following "mighty pretty" legend, which I quote from a German work on Botany, is worth preserving in the pages of Science-Gossip:—"Long long ago," a Hindoo king, named Darma, left his own dominions and travelled through China, with the avowed object of reforming the native population, and imparting to them a knowledge of religion. Unsuccessful in his missionary work, Darma thought to win the barbarous people by an example of unparalleled asceticism and devotion. For this purpose he gave himself to the practice of good works, and constant prayer; nay, he registered a vow that not even sleep should interfere with his daily and nightly exercises. But, alas! nature would claim her privileges, and slumber closed the eyes of the holy man for a time. Vexed at his own weakness, Darma settled the point about closing his eyes by deliberately snipping off the lids! Then it was (say the Chinese) that the Deity interposed by a miracle, which has resulted in the benefit of mankind for ever. No sooner did the two eyelids touch the ground, than there sprang up from each a plant, new in appearance, and new in its properties. Supernaturally instructed, Darma prepared the leaves, and found himself wonderfully strengthened and enlivened by the precious beverage. Of course he was not slow in communicating the valuable secret to his disciples; and so it has come to pass that in the written language of China an eyelid is the symbol of the tea-plant.—*W. W. S.*

Utricularia.—If your correspondent "B.," the writer of "Splits" in August number of Science-Gossip, will refer to the "Journal of Botany" No. 57, September, 1867, he will find my discovery of *Utricularia neglecta* in Gloucestershire; and last month of this year I sent specimens to Professor Babbington and a gentleman at Manchester.—*G. S. Winth.*

MICROSCOPY.

The Celery-leaf Miner (*Tephritis onopordinis*).—This has been a jubilee year with all the insects that prey upon our cultivated plants; the weevils and beetles, wireworms, flies, grubs, aphides, and caterpillars have had it all their own way. My cabbages are stripped to the stumps, my cucumbers and marrows are drilled through at the roots, my potatoes bored full of holes, my apples are all dropping from the trees, my turnip-tops are riddled as though ten thousand hedge-poppers had been blazing away charges of snipe-shot over the beds, and the leaves of my celery plants are all over blisters and brown patches. Opening one of these blisters the other day, I found therein a green maggot about one eighth of an inch in length, with a broad and flattish tail, from which his round, tight-looking body tapered to his sharp-pointed head, or rather mouth—for head, according to our common notions of heads, he had none. There he was between the two paginæ of the leaf burrowing tunnels, and feasting on the juicy cellular parenchyma in which his speckled-winged mother had deposited him in the form of an egg last April. These creatures, the larvæ of the fly named above, are swarming in myriads. Why don't they confine their attention to the common cotton-thistle from which they get their ugly names, instead of running riot amongst our celery and parsnips. I have got rid of these invaders and saved my celery trenches by pinching the blisters whenever they appeared, in accordance with the advice of Mr. Curtis, contained in his "Farm Insects," in which interesting work a full description of *Tephritis*, amongst many others, with beautiful coloured drawings of the insect in all its stages, will be found. This larva being very thin-skinned and almost transparent, is a capital object for young microscopists, to whose notice I specially commend it. Placed in the live-box, and pressed just sufficiently to keep it from wriggling out of the field, the body being flattened a little by the operation, so as to keep the viscera pretty evenly in the plane of the focus without impeding their natural play, one can hardly wish for an easier and more beautiful living illustration of the internal mechanism of *insecta* in the larva stage. With a two-thirds objective the muscles of the never-resting mouth show through the smooth filmy skin like blackened threads while they twitch and work. Nothing in the way of an eye is discernible, though probably the rudiments thereof are present, though undeveloped. Our larva—spending his working life inclosed in shafts and caves of his own excavating, and never going beyond the boundary-walls of the epidermis of the leaf—has no need of eyes at present. The dorsal vessel is so transparent, and its walls are so fine and delicate, that its structure would remain almost invisible, its very presence undiscoverable, but for its rhythmical pumpings. The little beadlike bubbles of the chylaqueous fluid can be observed chasing each other; the digestive apparatus looks a little indistinct. The great stores of fat which the fellow is so busily laying up in oily-looking globules confined in the finest of network, arranged in symmetrical rows along the edges of his back (I speak of his round back when flattened out by the glass of the live-box) show out well. These form the preserved provisions, out of which, during the next stage, the pupa will manufacture itself into the fully-developed imago—the pretty little fly with barred wings. But the breathing apparatus is the chief attraction; on either side of the dorsal vessel or elongated heart, runs a main tracheal tube silvery and shining, and not unlike a bright new harp-string, sending off its secondary branches, which again subdivide and ramify *ad infinitum*, till they become invisible even under a power of seventy-five diameters, carrying everywhere throughout the viscera, and even to the free floating globules of the blood,—for blood it is, though it isn't the fashion to call it so,—the vivifying marvellous agent oxygen. Here in these lowly creatures we see the air carried to the blood, *while higher in the scale* we find the blood carried to the air. After a good general survey has been taken with the two-thirds, it is worth while to flatten the object as much as it will bear without bursting, and to examine it with the quarter-inch, when the spiral arrangement of the muscular fibres of the tracheæ becomes beautifully distinct, and the teeth or curved horny plates of the very small and restless mouth become visible.—*J. Y. H., Bury Cross, Gosport, 10th Aug.*, 1868.

Mosquitoes.—Now that the subject of mosquitoes has insinuated itself into the metropolitan mind, and the lancets of mosquitoes are said to have insinuated themselves into metropolitan bodies, it may be apropos to allude to a paper on these insects which appeared in an early number of the *Quarterly Journal of Microscopical Science*, entitled "Auditory Apparatus of the Culex Mosquito, by Christopher Johnston, M.D." vol. iii. (1855), page 97, with plate.

Salsify Pollen.—Wherever it is cultivated, the Salsify is now in flower. Let all who admire pollen as a microscopical object, at once secure the pollen of this plant (*Tragopogon porrifolius*); and at the same time, although the chances are less, endeavour to procure the still more beautiful pollen of the Scorzonera (*Scorzonera Hispanica*), at one time common, but now rare, in our kitchen gardens. The pollen of all composite plants is good, but these are amongst the best.

NOTES AND QUERIES.

GOLD FISH.—When I kept gold fish I found several of them affected in the way described by "E. Y." and was told the water in their pond was impregnated with iron. I removed some of them into a glass aquarium filled with pure water, which I constantly changed, and the fish so treated recovered. If there is any *chalk* in the water the fish become liable to a sort of fungoid disease; they get white patches all over them, and lose their sight. But the presence of other minerals besides iron will, I believe, turn them black. Some of the finest, most brilliantly-hued gold fish I ever saw in my life, I saw at Leigh Park a few weeks ago. Probably the temperature of the house, and the aquatic plants in their large aquarium had conduced to their well-doing. I doubt much if the inhabitants of the royal fish-ponds on the shores of Lake See-Hoo are in better condition Their water is the best. Of course "E. Y." is aware that all gold fish when young are dark coloured. They put on their burnished armour when they attain fish estate. They are vegetarians.—*Mrs. Alfred Watney.*

VIPER POISON FATAL.—Those who read the article at p. 175 of last year's SCIENCE-GOSSIP, will, I trust, have given me credit for a search after truth, and not have censured me for taking up one side of a question and being determined to stick to it at all hazards. I therein made a certain statement which I believed to be true, and though two or three correspondents opposed it, they failed to adduce any facts on their own side. I am now in a position to aid them, and can give them a well-authenticated instance of death from the bite of a viper. At the same time, the opinion I held has not been at all altered by the circumstance. A gentleman met me a short time ago, and gave me the following particulars:—A labouring man on a farm close by here was in the habit of picking up snakes, &c. with his hand, and flinging them to a distance from him; he often did this when mowing, much to the annoyance of those working with him. One day he picked up a viper which at once turned round and bit him in the thumb: shortly after, he turned very faint, and they laid him under a tree. A medical man (my informant's brother) attended him, but he died before evening. My friend knew the man personally, so that I have no doubt of the truth of the story. But the victim was a hard-drinking man, and his blood must have been in an exceedingly unhealthy state; otherwise I hardly believe death would have ensued. The gentleman told me of several other cases—indeed he had been bitten himself—but this was the only one he knew of that had proved fatal, He also told me of two vipers he had lately killed. from one of which he took *nine* mice, and from the other a good-sized slow-worm. Is the latter generally known to form part of the viper's diet?—*Henry Ullyett.*

WAS IT A MOSQUITO?—Four nights ago I was suddenly roused by what I fancied was a loud scream. On getting really awake I found it was what I thought at the time was a gnat. It was, however, the loudest buzzer I ever heard. On going to sleep again, I unfortunately left my arm uncovered, and received two bites, which seem to me quite different to gnat-bites. They were, and are yet, very painful, much inflamed and swollen, and show symptoms of gathering. As gnat-bites never give me pain for many hours, I think it might have been a Mosquito, as I have heard of their appearance in England this year.—*H. M. H., Kensington,* July 29.

MOSQUITOES.—"J. H. Crossman" published today a piece of information worth knowing. He says that the Mosquitoes at Mentone, where he passed last October, were remarkably vigilant and bloodthirsty, and that neither curtain nor lotion had any perceptible effects in damping their appetites. But one day, by accident, Mrs. Crossman gathered in the course of her morning's walk, a branch of wild rosemary, and placed it in her bedroom. From that time forward no single Mosquito ventured into the room, and during the remainder of their stay at Mentone Mr. and Mrs. Crossman slumbered unbitten and undisturbed under the protecting shade of the wild rosemary branch.—*Pall Mall Gazette,* July 27.

OSTRICHES.—The writer of the article in "All the Year Round," which your correspondent, "W. W. Spicer" draws attention to, had doubtless given credit to the native version of the reason why a few scattered eggs are always found in the vicinity of a nest. The ostrich is Mormonitic in his tastes, has sometimes as many as seven wives. They generally make one nest, and naturalists say the outsiders are laid by the ladies in waiting.—*H. E. W.*

BLECHNUM SPICANT.—With reference to a paragraph on page 187 of the August number, allow me to state that I have several times found the *fertile* fronds of this fern bifurcated, but do not recollect having seen the barren fronds in that condition. The locality in which my specimens were obtained is a damp plantation about half a mile from Oswestry. The division does not in any case extend to four inches, the length cited by your correspondent.—*W. W.*

DREISSENA POLYMORPHA.—I have collected this species in the Thames at Teddington and Weybridge, and believe it to be common throughout the river. *Dentalium.* I think "T. R." will find his fresh-water *Dentalium* to be a caddis-worm case of the genus *Limnophilus sericastorix* or *Stelodis. Fusus Berniciensis*, King (p. 165), for Bell-fish, Dawson, read Bell fide, Dawson.—*W. W. W.*

FOOD OF LONDON.—And now let us consider the vast machinery which is in operation for the supply of food to this metropolis. At the present time over three millions of people have to be fed daily; and yet so regular is the supply, that no one considers even the possibility of its failing. On the other hand, there is no redundancy; and not only does this supply regularly reach the metropolis, but it is distributed to our very doors. About 4,200 tons of fish; over 4,000 sheep; nearly 700 oxen; about 90 calves; 4,000 pigs, including bacon and hams; not less than 5,000 fowls and other kinds of poultry; besides a million or so of oysters, and eggs innumerable, with flour enough to make nearly a million quartern loaves; and vegetables, butter, and beer in proportion, are daily brought to this city. "Imagine," as Archbishop Whately says, "a Head Commissioner intrusted with the office of furnishing all these things regularly to the people. How would he succeed?" And yet all this goes on with the regularity and precision of a machine—without Government or even municipal interference, but simply through the magical power and unfettered action of free trade.—*Dr. Letheby, Lecture on Food.*]

Wood-borer from Ceylon.—The beetle found alive in "dunnage" at the Docks, and sent by "H. R. W." as coming from Ceylon, appears to be *Sinoxylon conigerum*, Gerstäcker (described in the Bericht. Verhandl. Akad. Berlin, 1855, and figured in Peters' "Reise nach Mozambique," 1862), one of the family *Bostrichidæ*, of which a much larger species, with bright red elytra (*Bostrichus capucinus*), is a somewhat dubious inhabitant of this country. The Ceylon insect does not appear to be well known, as there is an un-named specimen of it in the Brit. Mus. Coll., labelled "Madagascar" (Bowring); and it is not among the types there deposited of the new species of *Coleoptera*, from Ceylon, described by Mr. F. Walker in the Ann. and Mag. of Nat. Hist., 1848, although they comprise more than one insect closely allied to it. There are two European members of the genus *Sinoxylon* (*muricatum* and *sexdentatum*), and the type-form of the Ceylon species, with antero-lateral thoracic spines, and one short sharp spine in the deflexed part near the apex of each wing-case, appears to be widely spread over the African continent; very closely allied insects, viz., *S. unidentatum*, *S. scapulare*, and *S. Senegalense*, occurring at the Cape of Good Hope, Abyssiuia, and elsewhere in it. *S. scapulare*, according to a type so named in the Brit. Mus., differs from the species now being noticed only in having the upper portion of the elytra lighter in colour, and with the punctuation rather more remote; characters carried to a greater extent in the smaller *S. unidentatum*. Most of the members of this family present an extraordinary superficial resemblance to certain of the true *Xylophaga*, the habits of which, also, are common to them. But there are distinctly *five* points to the tarsi in the *Bostrichidæ*, of which the *first* is very small; whereas in the typical *Xylophaga* there are apparently only *four* points, the usual *fourth* joint being obsolete. The larvæ, moreover, of the *Bostrichidæ* have legs, which are wanting in those of the other insects; and in other respects they approximate to those of the malacodermatous *Ptinidæ*.—*E. C. Rye, 7, Park Field, Putney, S.W.*

A cold Companion.—A lady of our family, who resided in Louisiana, was nursing her young child. Every night her sleep was troubled by the strange sensation of a cold, gliding object which sought to draw the milk from her breast. On one occasion she felt the same impression, and it aroused her. She sprang up, summoned her attendants; a light was brought; they searched every corner, turned over the bed, and at last discovered the frightful nursling —a serpent of great size and of a dangerous species. The horror which she felt instantly dried up her milk.—*Michelet's "The Bird."*

Upland Frogs.—Can any of the readers of Science-Gossip inform me how it is that, at this season of the year, on all the hills round here, even though remote from water, the young frogs swarm in as large numbers as in the lowlands by the side of ponds and ditches? Is it possible that such tiny creatures, directly they leave the tadpole state, can journey in some cases quite half a mile from any water to pass their existence on a common, the grass of which, especially this summer, is quite burnt up? And if instinct teaches these little creatures to clamber to such heights, and voluntarily to exile themselves from all the damp and boggy places they love to dwell in, what reason can be assigned for their so doing?—*A. G.*

Bifurcated Ferns.—In the last number of Science-Gossip Mr. T. Davies inquires whether a bifurcated fertile frond of the *Blechnum spicant* is of common occurrence. I beg to inform him that I have frequently met with them in the west of Connaught, and have several specimens in my possession. Near the town of Oughterard I gathered a frond nineteen inches in length, branched about seven inches from the top; another specimen I found near Recess, Connemara, has the division about four inches from the top, and one of the branches is again *forked*. I have also a specimen of this fern, from Recess, the lower half of which is fertile and the upper barren. This "forking," so common in the *Scolopendrium vulgare*, is frequently met with in *Asplenium Adiantum-nigrum*, of which I have several specimens. I have, also, two specimens of bifurcated *Ceterach officinarum*; one I found growing on a wall near Bandon, the other at Headford, county Galway, and a specimen of *Polypodium vulgare*, forked about four inches from the apex of the frond, gathered at Creagh, near Ballinrobe, county Mayo. I would also remark that the *Osmunda regalis* grows abundantly near Oughterard, and all through Connemara.—*R. E., Galway.*

Tea-tree (*Lycium barbarum*).—Again my tea-tree is covered with scarlet fruit, large as grapes and bright as holly-berries. No one who knows this tree only in a barren state can conceive how beautiful it is when oval waxlike berries and pale green lanceolate leaves clothe its slender branches with mingled green and scarlet. In November last I put this question to the readers of Science-Gossip —"Is not the fruit uncommon?" but elicited no reply. I have known the plant for many years in both northern and eastern England, but never saw its fruit elsewhere. I have inquired, but cannot find that any of my friends have been more fortunate than myself. Nor do I find that even here, in the "sunny South," the fruit is common. Will you again direct attention to the matter, and ascertain, if possible, whether the plant may not have been introduced from some warmer clime where it commonly assumes that beauty which in our less sunny island seems so rare?—*W. C. C.*

Insects on Ferns.—Could any of your correspondents tell me any easy way of destroying insects on ferns? Many of my ferns are being ruined by a very small black insect, about the size of a midge, and in spite of constant washing, sometimes with soap-and-water, they are still as vigorous as ever. The foreign and half-hardy ferns seem to attract them most; one plant of *Platyloma rotundifolia* and an *Asplenium viride* being quite ruined by them. If you could tell me any effectual way of getting rid of them, I should be very much obliged.—*A. A.*

Red House-Ant.—Can any kind reader inform me how to destroy ants? Our house is overrun with them, especially the larder. They are a small red kind.—*H. F. M.*

Spider Bites.—I can confirm F. B. M.'s assertion relative to the impression left by a spider's bite, as last summer my son caught one and closed his hand upon it; it bit him instantly and left two small blood-stains where it evidently bit him. My wife was bitten, but there was simply a slight swelling.—*G. B.*

Fossil Reptiles and Fish from the Northumberland Coal-measures.—I have during the past few months succeeded in making a very large collection of fish and reptile remains from the Northumberland coal-measures. Many of them I have obtained by personal research, and many have been received from boys in the colliery villages, who have collected them in competition for a series of prizes, which I offered early in June for the best collections. The fossils have been obtained from the shale which overlies the Low Main seam of coal, which is being worked in all the collieries in Northumberland where steam coal is being raised. The amount of shale which overlies the coal differs very considerably in different localities; in some it is not more than half an inch in thickness, in others it is sometimes eight inches thick, and in others it is absent altogether. Those collieries in the centre of the steam-coal field have a larger supply of shale over the coals, and those in the extreme north, such, for example, as North Seaton, have not any fossilliferous shale in the workings. I have succeeded in collecting a considerable number of complete and incomplete jaws, with teeth of *Palæoniscus*, *Rhizodopsis*, *Megalichthys*, &c., together with single teeth or tubercles of those genera and of *Rhizodus*, *Ctenoptychicus*, *Diplodus*, *Gyracanthus*, *Holoptychius*, *Strepsodus*, and others. I have also found several fine specimens of the palate-plates or teeth of *Ctenodus*, and jaws of the new species *Acanthydopsis*. Scales of nearly all the above genera, either single or in large patches, are also in my gatherings, together with vertebræ of various kinds, ribs, spines, and other fish remains. Various fragments of reptiles have also been collected. I trust in the course of a few months to have selections from the specimens gathered classified and arranged, after which I may trespass upon your space for more lengthened descriptions of some of the more rare or novel speci mens. In the mean time, and in consequence of the quantities of material I have had forwarded to me in competiton for prizes, I have in my possession hundreds of duplicate specimens of teeth, vertebræ, scales, &c., one specimen of any of which, unmounted, I shall have pleasure in forwarding to any reader of Science-Gossip who may send me a stamped and addressed envelope for that purpose. I shall probably receive hundreds of applications for specimens of fish remains; it is manifest, therefore, that I cannot possibly reply to inquirers singly; but should any of the queries require an answer, I shall, with your permission, give a general reply in my next contribution to your pages.—*T. P. Barkas, Newcastle-on-Tyne.*

Insect Eggs.—In answer to the query of "H. A. S.," in this month's Science-Gossip, I have had the eggs of *Pontia brassica*, *Vanessæ atalanta*, and others, for the last three years, mounted as microscopic objects, and as yet there is no appearance of the larva coming out. I prepared them for mounting thus:—Dipped them in paraffin oil (the oil used for lamps) for four or five hours, and then put them on blotting-paper to dry, and, when dry, mounted them in the usual way.—*C. B. Bostock, M.R.C.V.S.*

Cuckoo's Egg.—With respect to the assimilation between the cuckoo's egg and the foster parent, I also have noticed this but twice out of four times. The egg was laid before the nest was completed, in which case the bird could not have seen the other eggs, and so could not have copied them.—*W. E. M.*

The Heron in France.—So keenly was he hunted that already in the reign of Francis I. he had grown rare. That monarch lodged him near his own palace at Fontainebleau, and established there some heronries. Two or three centuries pass, and Buffon can still believe that there are no provinces in France where heronries could not be found. In our own days Toussenel knows of but one in all the country—at least in its northern districts, in Champagne; a wood between Rheims and Epernay conceals the last asylum where the poor lonely bird still dares to hide his loves.—*Michelet's "The Bird."*

Trees! Trees!—It has been suggested that trees should be planted upon the new Thames embankment. All lovers of nature and natural objects, should support such a suggestion, and upon all occasions recommend, persuade, and zealously enforce the adoption of a plan so extensively and successfully adopted on the banks of the Seine.

Bug-skins.—I have no longer the shadow of a doubt as to bugs casting their skins, as one to-day cast his on my hand before my eyes; thus I could not doubt it. I do not mean to assert that I have no reason to doubt my own eye-perceptions as I am continually being deceived, but in the present instance I called in the aid of the microscope, and thus felt thoroughly impressed in my conclusion.—*G. Bullard.*

Plumules.—I find the plumules plentifully on the upper surface of the wings of the male of the small Cabbage White Butterfly, but have failed in finding a single specimen on the wings of the male of the large Cabbage (*P. brassicæ*). I have caught specimens and examined them at once, before the wings had any chance of being rubbed, and I have examined cabinet specimens and failed alike in all. Mr. Wonfor has figured the plumules, which are different from those of *P. rapæ*, and if he has found them, why are they absent from any individual male of the same species?—*J. A. S.*

Asleep or Awake.—In Dr. Chenevix Trench's work on the Miracles of the New Testament, there occurs (at the conclusion of his notes on the Miracle of the Walking on the Sea,) a statement which has always appeared to me extremely incredible. "In regard to this very law of gravity, a feeble, and for the most part unconsciously possessed, remnant of his power survives to man *in the well-attested fact that his body is lighter when he is awake than sleeping;* from whence he concludes that the human consciousness, as an inner centre, works as an opposing force to the attraction of the earth and the centripetal force of gravity, however unable now to overbear it." The writer adds in a foot-note, "It was noticed long ago by Pliny, H. N. 2, 7, c. 18. Every nurse that has carried a child would bear witness to the fact." I have sought, but never yet found, an opportunity of verifying this, to me, extraordinary statement. I have always attributed the well-known *apparent* increase of weight in sleep (or death) to the absence of the elasticity or "spring" of life and consciousness. Have any of your correspondents ever tested the matter by weight and scale? Or can any authority, more modern than Pliny, or more scientifically accurate than a nurse, be adduced in evidence of what is here affirmed to be a well-attested fact?—*Rev. J. B. B.*

Feather Down.—Very little attention has been paid to the microscopical structure of the lower or downy portion of feathers. It is true that a certain peculiar type prevails in most (probably all) cases, but this type is represented under variable phases; and a number of distinct microscopical objects may be obtained from the feathers of birds. Let, for instance, the down of the little Gold Crest be compared with that of the Tawny Owl, and either of these with that of the Cuckoo or the EiderDuck, and it will be found that so much do these differ, the one from the other, that the uneducated eye will at once appreciate the beauty and variety of a class of objects hitherto unknown, or but imperfectly known, and inadequately valued.—*M. C. C.*

Elephant Hawk Moth.—A friend of mine had a larva about an inch long, of the Elephant Hawk Moth (*C. elpenor*), brought to him about three weeks ago, which was found on some bogbean about four miles from here. We went there and found more than twenty, and afterwards three or four on bedstraw. I had four pupæ out of those I found, which changed about a fortnight ago. Fully expecting them to remain in the pupa state until next June, imagine my *surprise* when, on looking at my pupæ this morning, I found two imagos emerged. This seems *extraordinary*, as both the "Lepidopterist's Calendar" and Mr. Newman's "Moth Nos." say that the *moth* is found in *June*, and the *caterpillar* in *August*. Has any other entomologist experienced this *unusual* occurrence? My friend had a Poplar Hawk Moth (*S. populi*), apparently fresh from the pupa, given him about a week ago. Could this be from last year's larva?—*A. Mathews.*

The Mosquitoes at Woolwich.—Is there not some misapprehension in supposing the insects now investing Woolwich to be anything more than common gnats, born and bred in their native home, the tide ditches of Plumstead and the opposite Essex marshes, this year produced in greater abundance by the unaccustomed heat, house-tanks and water-butts all aiding in the increase of the enemy? As the last stage of the gnat's growth is completed in water, it does away with the notion that this invasion of pests could have been imported in transport ships from Bermuda, or that they are mosquitoes at all. Surely the inflaming venom of a gnat-bite is bad enough!—*W. B.*

Male Hops.—There is an idea prevalent among hop-growers that it is necessary to have a few male plants growing in the hop-gardens; although they are to all intents and purposes entirely useless, as far as I can see, considering that the maturity of the seed is a matter of no, or at least of very secondary importance, and that the active principle of the plant resides in the female flower. Accordingly, here and there in the hop-grounds that I have visited, male plants are to be seen. Can any of your botanical readers tell whether, since the seed is not wanted, there can be any foundation for the supposition that they are advantageous?—*F. M. N.*

Onions and Epidemics.—Like many other things under the sun, the supposed discovery of John B. Wolff as recorded in "Scientific American," and reprinted in Science-Gossip of last month, is not by any means new. It is an old wife's or rather nurse's remedy for the prevention of the spread of infectious fevers, and I have often been warned by the latter class of useful beings to throw away all cut onions, and especially to take care that they were not used for food when sickness had been in the house. Did an "old wife's saw" put Mr. Wolff on the track to find the cause why the onion-eating sailors were attacked with cholera more than the others? If so would it not have been more gallant on his part to have given all due honour to the "old wives" aforesaid?—*Anna Maria Hall, Hackney.*

Sticklebacks and Carp.—Some fortnight or three weeks since, finding one of my tanks rather overstocked with fish, I took out three or four carp, and an equal number of tench, and put them into another tank containing sticklebacks. Almost immediately after they were put there, the sticklebacks set upon the carp and gave them no rest until they died, which occurred in three or four days, not one of them having more than a vestige of fin and tail left. The tench have not been molested at all, and remain with the sticklebacks apparently happy and comfortable. This reminded me of an old farm labourer in Warwickshire having told me when a boy, that no fish would ever injure a tench, as it acted the part of a doctor, and cured fish of all sorts of diseases.—*J. G. Odelly.*

Privet Hawk.—The caterpillars of the Privet Hawk Moth (*Sphinx ligustri*) are unusually early in their transformations this year. I possess nine chrysalides at present. Can any of your correspondents inform me the cause of a disease rather prevalent among them? The hinder portion turns quite *black* and hard: the caterpillar lives for a time but soon dies. This morning (August 11th) I found a young privet about *an inch long* under the soil, exhibiting all the symptoms of the transformation into the pupa. What was he doing? Was he only going to change his skin?—*H. H. O'Farrell.*

Tenacity of Life in the Cockroach.—Your readers will doubtless be made aware by yourself of the recent discovery of a lizard in a nodule of ironstone at Brixham, Devon. I know not whether my discovery was as extraordinary, but at any rate I consider it very singular. Cutting a piece of stale bread in two at dinner the other day, I bisected a cockroach, the knife passing just across the top of the body, or shoulders. To my surprise the head portion extricated itself from the hole in the bread (the surface of which bore the appearance of having been eaten by the insect), and walked some four inches away. It then stopped, overbalanced itself, and turned legs upwards, kicking away for about a minute, when I ended its sufferings—if it had any, which is doubtful seeing what it had previously gone through. I have met with these gentry in bread before, but they have always been dried up and brittle. On crushing these household pests in ordinary a white creamy substance exudes. In the present instance, however, the body was filled with a bright greenish liquid which ran freely out. In this case the feelers were broken, but the legs were perfect, the hinder ones did not exhibit any muscular action, nor did the main portion of the body show any signs of life. I send this to you thinking it may be worthy of record in your pages that an ordinary cockroach should have endured the kneading and baking process of the loaf, imprisonment for two days, followed by decapitation, and then be able to walk away with a comparatively nimble step.—*P. F. N., Brixton.*

NOTICES TO CORRESPONDENTS.

ALL communications relative to advertisements, post-office orders, and orders for the supply of this Journal should be addressed to the PUBLISHER. All contributions, books, and pamphlets for the EDITOR should be sent to 192, Piccadilly, London, W. To avoid disappointment, contributions should not be received later than the 15th of each month. *No notice whatever can be taken of communications which do not contain the name and address of the writer*, not necessarily for publication, if desired to be withheld. We do not undertake to answer any queries not specially connected with Natural History, in accordance with our acceptance of that term; nor can we answer queries which might be solved by the correspondent by an appeal to any elementary book on the subject. We are always prepared to accept queries of a critical nature, and to publish the replies, provided *some* of our readers, besides the querist, are likely to be interested in them. We cannot undertake to return rejected manuscripts unless sufficient stamps are enclosed to cover the return postage. Neither can we promise to refer to or return any manuscript after one month from the date of its receipt. All microscopical drawings intended for publication should have annexed thereto the powers employed, or the extent of enlargement, indicated in diameters (thus: × 320 diameters). Communications intended for publication should be written on one side of the paper only, and all scientific names, and names of places and individuals, should be as legible as possible. Wherever scientific names or technicalities are employed, it is hoped that the common names will accompany them. Lists or tables are inadmissible under any circumstances. Those of the popular names of British plants and animals are retained and registered for publication when sufficiently complete for that purpose, in whatever form may then be decided upon. ADDRESS No. 192, PICCADILLY, LONDON, W.

J. B.—The sedge is undoubtedly *Carex paludosa.—A. G.*

C. P.—An excellent example of reversion.

G. T. P.—The humming bird hawk-moth has been seen in other metropolitan localities, even nearer to St. Paul's than Clapham Rise.

F.—The beautiful little fly reared from the inside of an orange is *Ceratites citriperda*. See article by MacLeay in *Zoological Journal*, vol. iv., p. 475.—*I. O. W.*

H. W. has no very high opinion of London microscopists, or of ourselves, to suppose that when Moller's Typen Platte was exhibited and examined, they, or we, were unable to tell whether the objects were real diatoms, or only photographs. What could have set H. W. hunting for such a mare's nest?

J. R. E.—Ehrenberg's "Infusoria," about ten guineas; Adams' "Essays on the Microscope" (1798), 16s.; "Micrographic Dictionary" (1860), 45s.; Griffiths' "Text-book of the Microscope" (1864).

G. S. W.—Common barnacles (*Balanus balanoides*) and young mussels. Certainly not rare.

J. M.—The 15th is the latest date at which any query should be sent to us for reply in the next number.

JENNY.—Have you never read the notice at the head of this page, especially concerning anonymous communications?

W. W.—For special entomological information consult the *Entomologist's Monthly Magazine*. Van Voorst.

J. C.—It is rumoured that "Moore's Index Filicum," which was commenced eleven years ago, and has ceased for six years, is to be continued. Wonders never cease.

T. R. is thanked for slide of *Navicula Jenneri*. It is very probable that some readers would be glad to exchange.

J. W. L.—You surely could not expect moths to emerge from eggs kept in spirits since last May. The query alluded to eggs mounted forthwith.

UNANSWERED.—The meetings of the British Association cause a delay in answering some correspondents until next month.

S. P.—Burmeister's "Manual of Entomology," translated by Shuckard; Westwood's "Introduction to the Modern Classification of Insects;" and Kirby and Spence's "Introduction to Entomology," are all good books for a beginner in the study of Entomology.

R. S.—The insects causing "anbury" in turnips are said to be *Anthomyia brassicæ* and *Anthomyia radicum* of the order Diptera.

J. R. P.—Nonsense! The aërial shoots of the Indian banyan tree descend from the branches to the ground, where they take root.

C. M. H.—May procure botanical collecting-boxes of japanned tin, from Mr. How, Foster Lane, Cheapside.

J. T. S.—The "Bockett Lamp," sold by Mr. Collins, is generally approved. There is no danger of explosion.

C. A. J. complains that the paragraph in "Exchanges" for last month was inserted in error.

EXCHANGES.

STAMPED and directed envelope will secure a little Seaweed rich with *Grammatophora marina*.—Wm. Swinburn, 5, Rosemary Lane, Whitehaven.

FERNS.—*Hymenophyllum Wilsoni* for *H. Tunbridgense*.—Address, J. Bowman, Cockan, Lamplugh, Cockermouth.

BRITISH CRUSTACEA.—*Atelecyclus heterodon*, *Galathea strigosa*, and *G. squamifera*, or others, in exchange for *Portunus marmoreus* and *P. holsatus*.—G. Sim, 20, King-street, Aberdeen.

MARINE SHELLS of Portland, Maine, U S. eighty-five species offered for British Cretaceous Fossils, or other objects of Natural History.—E. C. B., care of the Editor.

AMERICAN DIATOMS (mounted) from North Bridgton (2), South Bridgton (2), Beddington, Albany, and Waterford, Maine, U.S., for mounted British Diatoms.—A. G., care of the Editor.

RARE SCOTTISH MOSSES, particularly those of the Clova mountains for others, English, Irish, or Exotic.—Apply to Rev. John Fergusson, Glenprosen Manse, near Kirrieman, N.B.

DIATOMS (mounted) from Perley's Meadow deposit, Bridgton, Maine, U.S., in exchange for other good mounted objects. —"Portland," care of the Editor.

DIATOMACEOUS DEPOSIT, from Cherryfield, Maine, U.S., in exchange for good mounted objects.—B., care of the Editor.

MEMBRANE OF BAT.—Wing membrane of Madras Bat (mounted) for good entomological object.—M. C. C., 192, Piccadilly.

SPICULAR SAND from base of Neptune's Cup sponge from Singapore, for unmounted objects.—W. W., care of the Editor.

BRITISH LEPIDOPTERA.—Send for lists to Miss Scriven, Castle Abbey, Northampton.

BRITISH FERNS for other British Ferns.—Send list to J. B., 224, W. George Street, Glasgow.

UNMOUNTED OBJECTS for exchange.—Send lists to W. H. R., 12, Bonaccord Lane, Aberdeen.

"FURZE MITES" offered in exchange for eggs or larvæ of the Death's Head Moth, or Swallow-tail Butterfly.—Address, W. F. H., 1, Belton Villas, West Hill, St. Leonards.

LEPIDOPTERA wanted in exchange for rare dried British Ferns or Mosses.—J. E. M., Woodfield, Moseley, Birmingham.

SEAWEED from the Gulf Stream, covered with a beautiful polype (one of the *Campanulariæ*) for rare British Seaweeds or Polypes.—J. Humphreys, Cheltenham Branch Dispensary.

BOOKS RECEIVED.

"Guide to the Museum of the Murray Royal Institution, Perth." Edinburgh, 1868.

"Naturalist's Circular," No. 27. London: Henry Hall.

"Transactions of the Woolhope Naturalist's Field Club, for 1867." Hereford, 1868.

"The American Naturalist," for August, 1868, Vol. ii. No. 6. Salem: Peabody Academy of Science.

"Miscellanea Anthropologica; or, Illustrations of Races," by C. O. Groom Napier, F.G.S. London: Groombridge & Sons.

"Charnwood Forest; its Air, its Scenery, its Natural Curiosities, Antiquities, and Legends," by Frederick T. Mott. 3rd edition. London: Kent & Co.

"The Gold Fields of Nova Scotia," by A. Heatherington. London: Trübner & Co.

COMMUNICATIONS RECEIVED.—R. D.—E. C. R.—J. B.—G. T. P.—T. Q C.—W. W. W.—W. E. M.—C. P.—A. C. K.—G. S. W.—C. B. B.—W. W. S.—E. L.—W. W.—H. G. W.—W. B.—J. B.—R. A.—G. S.—J. F. C.—E. B.—H. F. M.—W. F. H.—J. R. E.—T. W.—G. B.—Rev. J. B. B.—A. M.—R. E.—J. F.—C. O. G. N.—J. W.—G. S. W.—S. S., Manchester.—A. A.—J. Y. H.—S. B.—J. P. G. S.—J. A. S.—G. B.—R., Strand.—F. M. N.—R. R.—S. P.—W. W.—J. S.—J. G.—R. S. W.—W.—W. C. C.—M. P.—R. A.—J. J. T.—S. M.—M. E.—N. A. T.—B. B.—Wilson.—S. O.—L. E. W.—H. R. W.—C. A. J.—C. O. G. N.—E. S.—C. M. H.—G. E.—H. H. O. F.—J. G. O.—J. R. P.—A. M. H.—R. W.—J. H. R.—W. H. K. J. E. M.—W. G.—J. L. M.—J. T.—C. M.—A. J. D.—J. S.—G. S. B.—M. D.—J. H.—J. Le B.—J. B.—C. L.—F. R. M.—W. S.—J. B. G.—F. W. B.—W. F. H.—J. Y.—J. B. L.—B. T.—M. D. P.—A. C.

PHENOMENA OF EARTHQUAKES.

By BARON VON HUMBOLDT.

If it be the duty of the men of science who visit the Alps of Switzerland, or the coasts of Lapland, to extend our knowledge respecting the glaciers and the aurora borealis, it may be expected that a traveller who has journeyed through Spanish America should have chiefly fixed his attention on volcanoes and earthquakes. Each part of the globe is an object of particular study; and when we cannot hope to penetrate the causes of natural phenomena, we ought at least to endeavour to discover their laws, and distinguish, by the comparison of numerous facts, that which is permanent and uniform from that which is variable and accidental.

The great earthquakes, which interrupt the long series of slight shocks, appear to have no regular periods at Cumana. They have taken place at intervals of eighty, a hundred, and sometimes less than thirty years; while on the coast of Peru, for instance at Lima, a certain regularity has marked the periods of the total destruction of the city. The belief of the inhabitants in the existence of this uniformity has a happy influence on public tranquillity, and the encouragement of industry. It is generally admitted that it requires a sufficiently long space of time for the same causes to act with the same energy; but this reasoning is just only inasmuch as the shocks are considered as a local phenomenon; and a particular focus, under each point of the globe exposed to those great catastrophes, is admitted. Whenever new edifices are raised on the ruins of the old, we hear from those who refused to build that the destruction of Lisbon on the first day of November, 1755, was soon followed by a second, and not less fatal convulsion, on the 31st of March, 1761.

It is a very ancient opinion, and one that is commonly received at Cumana, Acapulco, and Lima, that a perceptible connection exists between earthquakes and the state of the atmosphere that precedes those phenomena. But from the great number of earthquakes which I have witnessed to the north and south of the equator, on the continent and on the seas, on the coasts and at 2,500 toises height, it appears to me that the oscillations are generally very independent of the previous state of the atmosphere. This opinion is entertained by a number of intelligent residents of the Spanish colonies, whose experience extends, if not over a greater space of the globe, at least over a greater number of years, than mine. On the contrary, in parts of Europe where earthquakes are rare compared to America, scientific observers are inclined to admit an intimate connection between the undulations of the ground and certain meteors, which appear simultaneously with them. In Italy, for instance, the sirocco and earthquakes are suspected to have some connection, and in London, the frequency of falling stars, and those southern lights which have since been often observed by Mr. Dalton, were considered as the forerunners of those shocks which were felt from 1748 to 1756.

On days when the earth is shaken by violent shocks the regularity of the horary variations of the barometer is not disturbed within the tropics. I had opportunities of verifying this observation at Cumana, at Lima, and at Riobamba; and it is the more worthy of attention, as at St. Domingo (in the town of Cape François) it is asserted that a water-barometer sank two inches and a half immediately before the earthquake of 1770. It is

also related that, at the time of the destruction of Oran, a druggist fled with his family, because, observing accidentally, a few minutes before the earthquake, the height of the mercury in his barometer, he perceived that the column sank in an extraordinary manner. I know not whether we can give credit to this story; but, as it is nearly impossible to examine the variations of the weight of the atmosphere during the shocks, we must be satisfied with observing the barometer before or after these phenomena have taken place.

We can scarcely doubt that the earth, when opened and agitated by shocks, spreads occasionally gaseous emanations through the atmosphere, in places remote from the mouths of volcanoes not extinct. At Cumana it has already been observed that flames and vapours mixed with sulphurous acid spring up from the most arid soil. In other parts of the same province the earth ejects water and petroleum. At Riobamba a muddy and inflammable mass, called *moya*, issues from crevices that close again, and accumulates into elevated hills. At about seven leagues from Lisbon, near Colares, during the terrible earthquake of the 1st of November, 1755, flames and a column of thick smoke were seen to issue from the flanks of the rocks of Alvidras, and, according to some witnesses, from the bosom of the sea.

Elastic fluids thrown into the atmosphere may act locally on the barometer, not by their mass, which is very small, compared to the mass of the atmosphere, but because, at the moment of great explosions, an ascending current is probably formed, which diminishes the pressure of the air. I am inclined to think that in the majority of earthquakes nothing escapes from the agitated earth, and that when gaseous emanations and vapours are observed they oftener accompany or follow than precede the shocks. This circumstance would seem to explain the mysterious influence of earthquakes in equinoctial America on the climate, and on the order of the dry and rainy seasons. If the earth generally act on the air only at the moment of the shocks, we can conceive why a sensible meteorological change so rarely precedes those great revolutions of nature.

The hypothesis according to which, in the earthquakes of Cumana, elastic fluids tend to escape from the surface of the soil, seems confirmed by the great noise which is heard during the shocks at the borders of the wells in the plain of Charas. Water and sand are sometimes thrown out twenty feet high. Similar phenomena were observed in ancient times by the inhabitants of those parts of Greece and Asia Minor abounding with caverns, crevices, and subterraneous rivers. Nature, in her uniform progress, everywhere suggests the same ideas of the causes of earthquakes, and the means by which man, forgetting the measure of his strength, pretends to diminish the effect of the subterraneous explosions. What a great Roman naturalist has said of the utility of wells and caverns is repeated in the New World by the most ignorant Indians of Quito, when they show travellers the guaicos, or crevices of Pichincha.

The subterranean noise, so frequent during earthquakes, is generally not in the ratio of the force of the shocks. At Cumana it constantly precedes them, while at Quito, and recently at Caracas, and in the West India islands, a noise like the discharge of a battery was heard a long time after the shocks had ceased. A third kind of phenomenon, the most remarkable of the whole, is the rolling of those subterranean thunders, which last several months, without being accompanied by the least oscillatory motion of the ground.

In every country subject to earthquakes, the point at which, probably owing to a particular disposition of the stony strata, the effects are most sensibly felt, is considered as the cause and the focus of the shocks. Thus, at Cumana, the hill of the castle of San Antonio, and particularly the eminence on which stands the convent of St. Francis, are believed to contain an enormous quantity of sulphur and other inflammable matter. We forget that the rapidity with which the undulations are propagated to great distances, even across the basin of the ocean, proves that the centre of action is very remote from the surface of the globe. From this same cause no doubt earthquakes are not confined to certain species of rocks, as some naturalists suppose, but all are fitted to propagate the movement. Keeping within the limits of my own experience, I may here cite the granites of Lima and Acapulco; the gneiss of Caracas; the mica-slate of the peninsula of Araya; the primitive thonschiefer of Tepecuacuilco, in Mexico; the secondary limestones of the Apennines, Spain, and New Andalusia; and, finally, the trappean porphyries of the provinces of Quito and Popayan. In these different places the ground is frequently agitated by the most violent shocks; but sometimes, in the same rock, the superior strata form invincible obstacles to the propagation of the motion. Thus, in the mines of Saxony, we have seen workmen hasten up alarmed by oscillations which were not felt at the surface of the ground.

If, in regions the most remote from each other, primitive, secondary, and volcanic rocks share equally in the convulsive movements of the globe, we cannot but admit also that within a space of little extent certain classes of rocks oppose themselves to the propagation of the shocks. At Cumana, for instance, before the great catastrophe of 1797, the earthquakes were felt only along the southern and calcareous coast of the Gulf of Cariaco, as far as the town of that name; while in the peninsula of Araya, and at the village of Maniquarez, the

ground did not share the same agitation. But since December, 1797, new communications appear to have been opened in the interior of the globe. The peninsula of Araya is now not merely subject to the same agitations as the soil of Cumana, but the promontory of mica-slate, previously free from earthquakes, has become in its turn a central point of commotion. The earth is sometimes strongly shaken at the village of Maniquarez, when on the coast of Cumana the inhabitants enjoy the most perfect tranquillity. The Gulf of Cariaco, nevertheless, is only sixty or eighty fathoms deep.

It has been thought, from observations made both on the continent and in the islands, that the western and southern coasts are most exposed to shocks. This observation is connected with opinions which geologists have long formed respecting the position of the high chains of mountains, and the direction of their steepest declivities; but the existence of the Cordillera of Caracas, and the frequency of the oscillations on the eastern and northern coast of Terra Firma, in the Gulf of Paria, at Carupano, at Cariaco, and at Cumana, renders the accuracy of that opinion doubtful.

In New Andalusia, as well as in Chile and Peru, the shocks follow the course of the shore, and extend but little inland. This circumstance, as we shall soon find, indicates an intimate connection between the causes which produce earthquakes and volcanic eruptions. If the earth was most agitated on the coasts, because they are the lowest part of the land, why should not the oscillations be equally strong and frequent on those vast savannahs or prairies, which are scarcely eight or ten toises above the level of the ocean?

The earthquakes of Cumana are connected with those of the West India islands; and it has even been suspected that they have some connection with the volcanic phenomena of the Cordilleras of the Andes. On the 4th of February, 1797, the soil of the province of Quito suffered such a destructive commotion that near 40,000 natives perished. At the same period the inhabitants of the eastern Antilles were alarmed by shocks, which continued during eight months, when the volcano of Guadaloupe threw out pumicestones, ashes, and gusts of sulphureous vapours. The eruption of the 27th of September, during which very long continued subterranean noises were heard, was followed on the 14th of December by the great earthquake of Cumana. Another volcano of the West India islands, that of St. Vincent, affords an example of these extraordinary connections. This volcano had not emitted flames since 1718, when they burst forth anew in 1812. The total ruin of the city of Caracas preceded this explosion thirty-five days, and violent oscillations of the ground were felt both in the islands and on the coasts of Terra Firma.

It has long been remarked that the effects of great earthquakes extend much farther than the phenomena arising from burning volcanoes. In studying the physical revolutions of Italy, in carefully examining the series of the eruptions of Vesuvius and Etna, we can scarcely recognize, notwithstanding the proximity of these mountains, any traces of a simultaneous action. It is, on the contrary, beyond a doubt that at the period of the last and preceding destruction of Lisbon the sea was violently agitated even as far as the New World, for instance, at the island of Barbadoes, more than twelve hundred leagues distant from the coast of Portugal.

Several facts tend to prove that the causes which produce earthquakes have a near connection with those which act in volcanic eruptions. The connection of these causes was known to the ancients, and it excited fresh attention at the period of the discovery of America. The discovery of the New World not only offered new productions to the curiosity of man; it also extended the then existing stock of knowledge respecting physical geography, the varieties of the human species, and the migrations of nations. It is impossible to read the narratives of early Spanish travellers, especially that of the Jesuit Acosta, without perceiving the influence which the aspect of a great continent, the study of extraordinary appearances of nature, and intercourse with men of different races must have exercised on the progress of knowledge in Europe. The germ of a great number of physical truths is found in the works of the sixteenth century, and that germ would have fructified, had it not been crushed by fanaticism and superstition. We learned at Pasto that the column of black and thick smoke which, in 1797, issued for several months from the volcano near that shore disappeared at the very hour when, sixty leagues to the south, the towns of Riobamba, Hambato, and Tacunga were destroyed by an enormous shock. In the interior of a burning crater, near those hillocks formed by ejections of scoriæ and ashes, the motion of the ground is felt several seconds before each partial eruption takes place. We observed this phenomenon at Vesuvius in 1805, while the mountain threw out incandescent scoriæ; we were witnesses of it in 1802, on the brink of the immense crater of Pichincha, from which, nevertheless, at that time, clouds of sulphureous acid vapours only issued.

Everything in earthquakes seems to indicate the action of elastic fluids seeking an outlet to diffuse themselves in the atmosphere. Often, on the coasts of the Pacific, the action is almost instantaneously communicated from Chile to the Gulf of Guayaquil, a distance of six hundred leagues; and, what is very remarkable, the shocks appear to be the stronger in proportion as the country is distant from burning volcanoes. The granitic mountains of

Calabria, covered with very recent breccias, the calcareous chain of the Apennines, the country of Pignerol, the coasts of Portugal and Greece, those of Peru and Terra Firma, afford striking proofs of this fact. The globe, it may be said, is agitated with the greater force in proportion as the surface has a smaller number of funnels communicating with the caverns of the interior. At Naples and at Messina, at the foot of Cotopaxi and of Tunguragua, earthquakes are dreaded only when vapours and flames do not issue from the craters. In the kingdom of Quito, the great catastrophe of Riobamba led several well-informed persons to think that that country would be less frequently disturbed if the subterranean fire should break the porphyritic dome of Chimborazo, and if that colossal mountain should become a burning volcano. At all times analogous facts have led to the same hypotheses. The Greeks, who, like ourselves, attributed the oscillations of the ground to the tension of elastic fluids, cited in favour of their opinion the total cessation of the shocks at the island of Eubœa, by the opening of a crevice in the Lelantine plain.

The phenomena of volcanoes, and those of earthquakes, have been considered of late as the effects of voltaic electricity, developed by a particular disposition of heterogeneous strata. It cannot be denied that often, when violent shocks succeed each other within the space of a few hours, the electricity of the air sensibly increases at the instant the ground is most agitated; but to explain this phenomenon it is unnecessary to recur to an hypothesis which is in direct contradiction to everything hitherto observed respecting the structure of our planet and the disposition of its strata.—*Personal Narrative.*

ASSOCIATION.

Give a man a microscope, and banish him to a little country village, or inclose him like a recluse in a cottage with a quarter of an acre of garden ground, and he will soon cease to remember that he is an exile or a recluse. If he should be an active and an observant man he will soon constitute himself the centre of a small universe. Shut out from books, from friends, from associates, he will plod on, day by day, seeing things he never saw before, and observing what he had often seen, but more closely and more minutely. In a little while he will have accumulated a vast store of information, have made numerous drawings, have unravelled many a tangled skein of mystery, have accomplished many discoveries. At the end of a year or two let this recluse be brought out from his retirement to compare notes with other workers in a like field, and witness the result. One by one his discoveries will upon comparison coincide with the observations of others; the mysteries he has puzzled over will be found solved by others; his drawings and his notes will many of them be only repetitions of what other men have done; and then he will, for the first time perhaps, arrive at the conviction that by living as a recluse and isolating himself from everybody of kindred tastes he has been deceived. The result of such an experiment will assuredly be dissatisfaction at the amount of labour which has been expended in vain, time lost in repeating what has already been done; and, although it is impossible to spend as much time without some profit, *that* profit will not be commensurate with the cost. The penalty of seclusion will make itself felt.

There are a few who wilfully seclude themselves, either from a selfish or jealous disposition, who work in secret, who study to conceal all they are doing from their fellows, who wouldn't give a hint towards helping a friend out of a difficulty for the world. Such specimens of humanity are happily rare, but the race is by no means extinct.

To counteract the disadvantages of isolated working, men with scientific pursuits have long been accustomed to band themselves together in associations. Entomologists, Geologists, Ornithologists, Microscopists, and others have combined to form societies for mutual help. All who love science for itself, and these are the majority, set a high value upon such companionship in arms. Those who stand aloof do so foolishly, or selfishly, thinking perhaps that they have more to communicate than to learn, and only discover their mistake when they are left behind—like Lot's wife—a pillar of salt, or a petrifaction.

It promises well for Microscopical Science in London that several flourishing associations exist in the metropolis. It is gratifying that the Royal Microscopical Society is more vigorous than ever; may it go on and prosper, and satisfy the greatest ambition of its best friends! But, above all, the success which has been achieved by the Quekett Microscopical Club, within three years of its establishment, is so unprecedented that there is every need for caution lest prosperity should not prove its best friend. Men may act nobly under adversity, but it is prosperity which tries their "mettle" most, and if they act well when all goes well, there is little fear of their actions in a day of ill. Hitherto all has gone well with the Club, and the prospect is as bright as ever, nay brighter; may its brightest be still to come!

A word or two upon the report which has recently been distributed amongst the members, and we have done. Each previous year we have made this an opportunity for urging the claims of the Club upon our readers. This year we accept the excuse for writing, but intend leaving the pleading, because the objects are so good, the meetings so harmonious, the proceedings so satisfactory, and the subscription so low that these are the best ad-

vocates, and if they fail we doubt the fault is elsewhere, and *not* with the Club. "I speak as to wise men, judge ye what I say."

The first report announced that 155 members had enrolled themselves; the second, that this number had increased to 273; and the third, that the total had reached 382. This is the first fact to be noticed, that in three years nearly 400 microscopists have united themselves into an association for their mutual benefit. How does it pay? suggests some one who has an eye to the balance-sheet. The close of the first year left a balance of £13 in the hands of the treasurer; of the second year, a balance of £35; and of the third year, a balance of £62. Another important fact, which we submit for the consideration of those kind friends who have been loud in their protestations that the Club could never be kept going upon so small a contribution as ten shillings a year, and no entrance fee—"It moves still!" Finally, what is the prospect of the cabinet of objects? In 1866 the number of slides presented was 123; in 1867 this was augmented to 263; and in 1868 the number reached was 700. Here again is another evidence, if evidence were required, that we are correct in the remark that the success of the Club has been unprecedented, and that the prospect is as bright as ever. For a record of what has been done during the three years we must refer our readers to previous notices which have been published in this journal, to the reports for the three years, and to the journal of the Club. Should any further information be required, it will be furnished freely and frankly by the indefatigable secretary of the Club, in reply to any communications addressed to our office.

We are occasionally asked what is the best course for a person to adopt who desires to become a microscopist. To this we have only one reply—although it includes two actions—*read our* GOSSIP, *and join our* CLUB!

FAIRY-RINGS.

It has long been known that the clusters of spores of the red rust often contain amongst them the bilocular spores of the wheat mildew; and the many-celled spores of the bramble-brand may at this time be found associated with the one-celled rust on the under surface of bramble leaves. It is admitted that the red rust and the mildew of corn are phases or conditions of the same fungus, and that both forms may proceed from the same mycelium. The same may be said of the rust and brand of the bramble, and of other species of *Uredines* and *Puccinia*. Hitherto, however, it has scarcely been suspected that two very different species of gill-bearing fungi should arise from the same mycelium and be, in fact, only conditions of one species. Although we are prepared to accept any such facts when proven, we hesitate to adopt conclusions based upon imperfect evidence.

The Woolhope Naturalists' Field Club has just issued a very handsome volume of their "Transactions" for 1867, and herein we find a paper by Mrs. Key, "On the probable identity of *Agaricus Georgii* and *Agaricus campestris*." Before quoting the reasons alleged for such identity, we must protest against the want of scientific accuracy evinced by reference to *Agaricus Georgii*, without defining *what Agaricus Georgii* is meant. If the *Agaricus Georgii* of Sowerby is intended, that is the "horse-mushroom," or *Agaricus arvensis* of Schoeffer; but if the *Agaricus Georgii* of Linnæus is meant, then it is the *Agaricus gambosus* of Fries, and also of Berkeley. The latter is a white-spored, the former a brownish-spored, species. Which is intended? Probably the former, a close ally of *Agaricus campestris*.

Mrs. Key writes:—"A few years ago a ring under a tree, not a hundred yards from Stretton Rectory, produced in the early part of summer a crop of these large, thick, pale-gilled agarics, which the cook, of course, pronounced unwholesome, and useless for the table. Two months later the same ring produced a second and very abundant crop; but this time it consisted of undoubted and very fine *A. campestris*, four to six inches across, thin, slender stemmed, and with fully-coloured gills. They were cooked without hesitation, and were excellent. In previous and subsequent years this ring has always borne *A. Georgii* of the most decided type."

Let us here observe, before proceeding with the narrative, that the *Agaricus arvensis* Schoeff. (the supposed *A. Georgii* above alluded to) is *not* "unwholesome and useless for the table," but, in our opinion, quite equal to *Agaricus campestris*, fuller flavoured, but none the worse on that account.

"Last year (1866), in the same meadow, but in a part far away from any hedge or tree, the reverse occurred: a large fairy-ring, hitherto always producing small, highly coloured and flavoured mushrooms of the best type, was crowded with comparatively small *A. Georgii*; and this variety appeared in a third spot of the same meadow near a tree, where two years ago very good and fine *A. campestris* grew.

"Further, in an adjoining field there grew, five or six years ago, in a ring near the hedge, a very abundant crop of the dark-brown variety of *A. campestris*, with slender stems, and caps quite thin and flat on reaching their full growth: last year (1866) this ring had *A. Georgii* growing in it. The *A. Georgii* variety appeared unusually plentiful in 1866. I noticed scattered specimens in quite open fields, where *A. campestris* would have been expected, as it more often grows in a detached manner than the so called '*Georgii*.' Every degree of colour, and

comparative thickness of cap and stem, could, in September, 1866, be found in the same manner. In another county, many years ago, a ring, partly beyond a tree and partly under its branches, produced mushrooms, graduating from the *campestris* to the *Georgii* form at the same time.

"These observations seem to indicate that some cause, to us unknown, varies these plants from year to year; and that the *Agaricus campestris* and *A. Georgii* are really but one species."

We know that *Agaricus campestris* is a very variable species; and we have no means of judging, either from specimens, drawings, or good descriptions, what Mrs. Key's *A. Georgii* really is, or whether it is anything more than a form of *Agaricus campestris*. We gain no greater confidence after perusing the following postscript:—

"This year (Sept., 1867) some mushrooms have grown under a tree, which, thin in cap and slender in stem, like *Agaricus campestris*, have the peculiar whiteness of *Agaricus Georgii* ('white caps' is its name in Covent Garden market), and turn yellow on being bruised; the gills are paler than in a really good mushroom, but not so pale as in *A. Georgii*, and they have scarcely any scent. They appear exactly intermediate, and are an additional instance of what is said above."

Although we cannot accept the conclusion, as based upon the evidence given by this lady, that *Agaricus campestris* L. and *Agaricus arvensis* Schoeff. are the same species, although found growing in close proximity, we may add a curious fact connected with the fairy-ring mushroom. Last year a grass plot in a garden near Norwich had a ring of puff-balls (*Lycoperdon gemmatum* Fr.) growing upon it. This year the same ring is occupied by the fairy-ring champignon (*Marasmius oreades*), and not a puff-ball has appeared. Would Mrs. Key have concluded from this circumstance that *Lycoperdon gemmatum* and *Marasmius oreades* are the same species?

The volume of "Transactions," from whence the above is quoted, contains also three excellent coloured plates of esculent fungi, with observations by Dr. Bull of Hereford. Other similar illustrations are half promised, and we hope will appear in the next volume. The Committee cannot do better service than by publishing such characteristic figures of good and poisonous fungi, under the superintendence of Dr. Bull. Six photographs of remarkable trees in Herefordshire, with other illustrations, and much valuable local information, enrich the volume, reflecting considerable credit on the Woolhope Club.

A Committee was formed at the Norwich meeting of the British Association to endeavour to secure protection for all birds during the breeding season. Mr. Frank Buckland is secretary.

A MONSTER OF THE DEEP.

The following observations are condensed from "Le Monde de la Mer," par A. Fredol: Paris, 1865:—

"For ages past stories have been current of the existence of gigantic species belonging to the Cephalopod or Cuttle-fish group of the Mollusca. Pliny tells of one, which was caught on the coast of Spain and sent to the Proconsul Lucullus, which weighed more than 700 pounds, with arms 30 feet long. Pliny, however, is completely outdone by Olaus Magnus, Archbishop of Upsala, who describes a colossal cephalopod, which was *a mile* long, and which, when it came to the surface, had more the appearance of an island than of a living creature: he gives it the name of the Kraken. Pontoppidan, Bishop of Berghen, adds that a whole regiment of soldiers might with ease manœuvre on the back of the floating monster. Indeed, a certain Bishop of Nidros—so the story runs—did actually erect an altar on this singular foundation (which he mistook for a rock, as the animal basked in the sun), and did then and there celebrate Mass. The legend adds that the Kraken submitted to the ceremony without flinching; but no sooner did the good bishop step ashore than it plunged into the depths of the ocean. Linnæus, in the first edition of his 'Systema Naturæ,' admitted the existence of this imaginary monster, and named it 'Sepia microcosmus;' later, however, it was expunged from his work.

"Although, however, the stories of island-like Krakens are of course fictitious, there seems to be little doubt that individuals of this family really do exist in the Mediterranean and other seas, whose dimensions fairly entitle them to the epithet 'gigantic.' Thus the famous diver Piscinola, who plunged into the Straits of Messina at the request of the Emperor Frederick II., declared, on his return to upper air, that he had been horrified by the sight of enormous cuttle-fish clinging to the rocks, whose arms, several yards long, seemed well fitted to strangle a man. Modern naturalists have recorded the capture of various huge cephalopods. M. Verany speaks of one which measured nearly four feet long, and was 30 pounds in weight. Peron,* in one of his voyages, described an individual, off the coast of Tasmania, moving slowly over the waves, with 'a body as big as a barrel,' and with arms not less than six feet long, which twisted about like so many hideous serpents. Quoy and Gaimard, when on the Atlantic, near the Equator, picked up the remains of an enormous cuttle-fish;

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* Dr. Fr. Peron collected in his travels upwards of 100,000 zoological specimens, of which not less than 2,500 were new species. Baron Cuvier said of him that he had made the acquaintance of more living forms than all the naturalists of his time put together. He died in 1810.—W. W. S.

it was but a portion of the body, without any arms, but they reckoned its weight at more than 100 pounds.

"Rang discovered a cephalopod in the same seas, whose body, of a red colour, presented the appearance of a large cask. In the London College of Surgeons there is preserved the mandible of one of these monsters which is larger than one's hand. It appears to have been brought from the North Sea.

"M. Steenstrup, of Copenhagen, has published some exceedingly interesting observations on a gigantic cephalopod, which he has named 'Architeuthis dux,' and which was thrown on the coast of Jutland. The body of this animal, when hacked to pieces by the fishermen, filled several wheelbarrows. The same naturalist has made us acquainted with another colossal mollusc, supposed to have been brought from St. Thomas, and called 'Dosidicus Eschrichtii.' Moreover, he showed to Professor A. Duméril a fragment of an arm of another species, which was as large round as a man's thigh.

"All this goes to prove that there are in existence species of molluscs related to the cuttle-fish of a size utterly unknown among other Invertebrates; but there is a piece of evidence still remaining which corroborates in a remarkable manner the information already given. I allude to the fact of one of these huge animals having been distinctly seen by the captain and crew of the French steamer *Alecto*. The history of this discovery is extracted from the official report of Commander Bouyer, and the relation of M. Sabin Berthelot, Consul for France in the Canary Islands. It was on the 30th of November, 1861, that the *Alecto* (then on her voyage to Cayenne, and forty leagues N.E. of the Canaries) came across a monstrous cephalopod swimming on the surface of the water. The animal measured fifteen to eighteen feet in length, not including the eight formidable arms, covered with suckers, which crowned its head. Its eyes were enormous, of a glaucous hue, and with a fixed stare frightful to look at. Its mouth, formed like a parrot's bill, had an opening of not less than eighteen inches; while the body, tapering towards the base, and greatly inflated in the middle, presented an immense mass, the weight of which was estimated at more than 4,000 pounds. Its fins, situated near the posterior extremity, were rounded off into two fleshy lobes of great size.

"The animal was perceived by the crew about two o'clock p.m., and the vessel was forthwith brought up close to its side, and preparations made to capture it. On receiving a musket-ball the monster plunged downwards, and, passing under the vessel, appeared on the other side. Here it was received with fresh discharges of musketry, and frequent strokes from harpoons, to avoid which it dived several times, and when on the surface threw its arms about in every direction.

"When this novel combat had continued for upwards of three hours, the captain of the *Alecto* determined to bring it to an end at all hazards. It was clear that the harpoons and musket-balls had hitherto made but little impression, as they sank into a soft substance which afforded no resistance. At last it appeared to have received some internal injury, for it vomited a quantity of froth, and a bloodlike matter, of a glutinous nature, which gave out a strong odour of musk. It was at this moment that the men managed to throw a kind of lasso round the animal, which, however, slipped along the whole length of the body, until it was arrested by the fins at the end. Efforts were now made to lift the monster on board the vessel. Already a large part was raised out of the water, when its enormous weight caused the rope to cut clean through the soft flesh, thereby separating the body into two unequal parts. Forthwith the huge animal, freed from its toils, sank slowly out of sight. The portion cut off, on being hoisted on board, was found to weigh 40 pounds: it was carried to Santa Cruz, in Teneriffe.

"It is probable that this individual was sick, or exhausted after a recent struggle with one of its fellows or some other monster of the deep. At least, it would be difficult on any other supposition to account for its having quitted the great abyss, or the rocks, to which it is apparently the habit of these monstrous cephalopods to cling; nor can we otherwise suggest why its movements were so sluggish, or why it refrained from discharging over the vessel the inky fluid which we know these animals employ in self-defence.* M. Berthelot ascertained from the Canarian fishermen that, when out on the open ocean, they not unfrequently saw large reddish-coloured cephalopods, six or seven feet long, which, however, they never had had the boldness to attack.

"The question remains, Was this huge monster most nearly related to the cuttlefishes (Decapods) or to the poulpes (Octopods)? To judge from the figure which M. Berthelot had the goodness to transmit to me,† the animal possesses two terminal fins, like that section of the cuttlefishes known as Calamaries (the poulpe, be it remembered, has no fins at all), but it is furnished with eight arms instead of ten, thereby assimilating itself to the Octopod group. Is it, then, a species

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* Might not the ejected fluid which gave out the odour of musk be the representative of the "ink," which is secreted by the smaller species, and which, however serviceable to them, would scarcely be needed by so huge a monster as this? The well-known "sepia," when prepared from the ink-bag of the poulpe, smells strongly of musk.—W. W. S.

† Plate XIII. This figure was drawn by one of the officers of the *Alecto* while the struggle was actually going on between the ship's crew and the huge mollusc. [The plate, which is coloured, represents the men in the act of drawing the creature out of the water.—W. W. S.]

intermediate between the two? Or must we admit that probably the creature had lost its two longer arms in the combat which we suppose it to have sustained previous to the attack made on it by the crew of the *Alecto?* This last is the view taken by those eminent malacologists MM. Crosse and Fischer, who have in consequence consigned it to the genus Loligo, under the name of 'Loligo Bouyeri.'"

Such is the account given of this wondrous specimen of a cephalopod by M. Frédol. As regards the gigantic mandible said by him to be preserved in the College of Surgeons' Museum, the assertion might be easily verified or refuted by some reader of Science Gossip familiar with that institution.

Clifton. W. W. Spicer.

TO COLOUR PHOTOGRAPHS OF NATURAL OBJECTS.

Many of the readers of Science-Gossip have doubtless observed the numerous coloured photographs sold at a cheap rate in London, particularly of flowers, birds, and insects, which are mostly done in France or Germany. The effect of some of these is good.

Having a number of photographs I wanted coloured, I induced a friend to try ordinary transparent water-colours on them. With a lightly-printed photograph good effects were obtained, but not without much labour,—in fact, an amount that would render the process inapplicable for illustrated books, on the ground of expense. I at last got a set of the American liquid colours,—namely, yellow of a chryso-beryl hue, mauve, scarlet, rose, brown, green, and blue. These are clear solutions, having more analogy with stains or dyes than with water-colours. I had coloured several large plates of precious stones, photographed from nature, and printed on albumenized paper: more transparency and depth of colour is, I think, attainable by this plan than by any other. We fancy we can almost lift the stones off the paper; they are clearly a step in advance of the finest steel mezzotint engravings coloured by hand. The use of these colours requires little knowledge of painting; some people say the less the better, for the qualities of the colours are so different. They are, however, easy to use when their properties become known. The following precious stones I had coloured with them with great success:—chryso-beryl, emerald, ruby, chrysolite, carbuncle, amethyst, topaz, jacinth, and sapphire. There is no deep yellow sold with these colours. I make a splendid stain with saffron,—in fact, a tincture of it, in spirit of wine. This, according to its intensity, will give us a colour from transparent light topaz-yellow to chrome-orange. I wish some of your chemical readers would suggest other colours,—among them a transparent black. Asphaltum dissolved in benzine is the best I know; but this is too opaque.

These liquid colours will hardly ever bear dilution with water. Spirit of wine will answer with some. They can rarely be mixed, and cannot be washed off. They will not flow over the albumenized paper, unless it is sized with such as Newman's preparation for sizing photographs, which I suspect to be only thin parchment size, with a trace of ox-gall. Negretti would keep it. The best way of using the colours would be, not from a palette or dish, but from small bottles, pouring a few drops into one as required for immediate use. Ox-gall should be at hand: of this the limpid, colourless extract is the best. Its use is to remove greasiness from the paper, and give concentration and intensity to colours. With plenty of ox-gall, I believe you could paint with these colours on collodion film. I tried the German plan of touching negatives with a blacklead-pencil or cobalt: this is much done in England; but it failed with me, my marks printing through. When desiring to give the effect of a compound colour, I put on first a wash of one solution and then of another, letting each dry first. I should consider it necessary to rebottle the solutions in stoppered bottles if travelling is contemplated, especially in warm weather. The corks are soon decomposed. Put melted caoutchouc round and over the stoppers, and tie them over, and you will be secure from leakage or adhesion.

The strongest possible tincture of saffron, made cold with spirit of wine, squeezed and saturated with fresh saffron three or four times, is the magnificent deep yellow I use. Several of Judson's simple dyes, in sixpenny bottles, will likewise answer. The maize and orange are particularly good.

The best green I found was made by mixing a solution of Prussian blue (not an acid solution) with the tincture of saffron: it is difficult to use, as the Prussian blue precipitates, and requires frequent shaking. I should like to find out a clear emerald-green neutral solution, and one also of the budding twig colour and the green apple.

I have mentioned these little details, thinking they might be useful to some of the many who want to preserve colour in photographic representations.

C. O. G. Napier.

Smooth Finger-grass.—I enclose a few specimens of that rare British plant, the Smooth Finger-grass (*Digitaria humifusa*). I found it growing near to a plant of the Sweet Basel, in the kitchen garden; consequently, I consider it to have been introduced with continental seeds, not having observed it in this neighbourhood before.—*C. Wood, Dulwich.*

THE PARIS EXHIBITION OF INSECTS.

READERS of Science-Gossip will doubtless recollect that in the July number, at p. 158, it was announced that an exhibition of useful and destructive insects would take place in Paris during the month of August; and it has occurred to the writer that, possibly, some few notes of a visit to the place may not be altogether without interest. The general arrangement and mode of classifications indicated in the article referred to were closely followed, so that a repetition of the particulars will be unnecessary; I would therefore merely now draw attention to the circumstance that, inasmuch as the exhibition was planned and carried out by the Société d'Insectologie Agricole, special prominence was given to those particular branches of entomological study which had an immediate bearing upon the objects for which that society was established. The exhibition took place in the Palais de l'Industrie, the spacious north-western gallery of which was partitioned off so as to form seven rooms, in six of which the various objects were displayed, whilst the seventh was fitted up as a lecture-room, in which conferences were held twice a week upon topics duly announced. Following the order laid down in the catalogue, my first attention was given to Class I., comprising silk-producing insects, with their products, methods of culture, diseases, and means of cure. Here were living silkworms of the ordinary kind in every stage of growth, contentedly feeding upon ample supplies of fresh mulberry-leaves, under the guard and protection of that ever-present personage the Sergent de Ville. Near to these a number of newly-spun cocoons were seen attached to frames of various kinds, and upon the same table were many paper trays containing moths and eggs. Nor were the different varieties of the common silkworm alone represented; specimens of *Bombyx Cynthia*, *Bombyx Yama-mai*, &c., were also there in various stages of growth, together with their cocoons and silk, both in the raw and manufactured state; and a very fine collection of cocoons of various silk-spinning worms from South America, Africa, Madagascar, and the East Indies attracted much attention.

Of apparatus for winding and preparing the silk, and testing its quality and strength, there was a good show, and the remaining space devoted to this class was occupied by examples of the effects of the diseases to which silkworms are liable, by diagrams and drawings, and by memoirs upon sericulture, both printed and in manuscript.

The next three rooms were entirely devoted to Class II. (Apiculture), and here were hives and their accessories of every material and shape, apparatus of all kinds for the refining and preparation of honey and wax, and indeed every other requisite of the bee-master. In the section assigned to the products of bees I found wax and honey of every quality, and in all stages of refinement; also a very tempting display of confectionery and chocolate in the manufacture of which honey had been employed, to say nothing of hydromels and the far-famed *pain d'épice* from Chartres and Dijon, so well known and appreciated by continental lovers of gingerbread. To give anything like a complete description of the contents of the room adjoining would obviously require space far exceeding the limit of a single paper, seeing that almost all insects not comprised in the two classes already noticed were to be found there. In the four remaining classes of useful insects were specimens, both alive and dead, of several varieties of cochineal and other insects used in dyeing, also of such as are employed in medicine, with samples of cantharidine in the sublimated and crystalline forms. Amongst those used as food there were certainly some which were quite new to me as articles of diet; but since, according to the programme, "Crustacea and Arachnida were to be considered as belonging to the same great zoological division as insects," here were also found crabs, crawfish, lobsters, &c.; and much valuable information was furnished as to the best means for their propagation and culture. The sixth and last class in this division contained such insects as are used for purposes of ornament; and many ingenious devices were shown, in which the iridescent elytra of beetles, and in some instances entire butterflies, were mounted as articles of jewellery, or were introduced with great taste and skill into the various productions of the fashionable modiste.

The second division of the exhibition (*insects nuisibles*) was subdivided into ten classes, in which the insects were arranged according to their habits, instead of in the scientific order of their genera, a plan admirably designed for practically useful purposes. Here, at a glance, a person interested in the cultivation of a particular plant might see specimens of every insect known to attack it, and not only were they shown in their perfect form and of both sexes, but also in the larva and the pupa states, with specimens of their eggs, and of dried portions of plants which had suffered from them. To each series labels were affixed, upon which were written the names of the insects, in Latin and in French, with brief notices of their ravages, and in some instances also the means of their extermination. One exhibitor in this department showed a collection so remarkable for its completeness and the care bestowed upon it that I cannot pass it by without a special reference; it consisted, in all, of eighteen glass-covered trays, the first five of which contained the destroyers of various kinds of fruit, arranged as described above. In the next three were those injurious to potherbs and edible fungi, and in the three following were the ravagers of meadow and field produce, and of the leaves of forest trees. Two

more were filled with insects which make havoc in different kinds of dry or growing timber, and another contained such as trouble animals and men. Those persons who are interested in the mosquito question may, perhaps, be glad to know that of the two species shown here, one was the common *Culex pipiens*, the other, a somewhat larger insect, being designated *Culex maculipennis*. For the destruction of hurtful insects an extraordinary number of devices were exhibited; such as bottles, fly-papers, poisons, and insecticide powders, together with a variety of apparatus for their effectual application.

In the third division (*Insectivora*) there was an excellent collection of stuffed birds, with their nests and eggs, and many contrivances for the fostering and preservation of their young. The value to the agriculturist of these feathered allies, especially in a country teeming with insect life, was demonstrated by carefully tabulated statements, and by the exhibition of upwards of 300 glass tubes, each of which contained the *débris* of cockchafers and other destructive insects taken from the crops of little birds. In the same class were also a number of live tortoises, lizards, and other insect-feeders, as well as of ichneumons, and such insects as prey upon their fellows. Many other items of much interest in this room must remain unnoticed; I would only name some beautiful dissections of insects intended for class instruction, some microscopes by several eminent opticians, and a set of well-executed microscopical drawings of parasitic insects of every kind.

In the last room to be examined I found a complete collection of every requisite for the entomologist and the collector; also a number of plants in a deplorable condition from the attacks of aphides and other garden pests; and a series of oil-paintings, representing the homes of insects and the unhappy plight of sundry animals who had ventured to intrude upon them. Here also upon a long table were numerous copies of different serials and books on natural history, very many of which are deserving of more than a passing notice. Of these, perhaps the most important was a work on the Coleoptera of Europe, in four volumes, illustrated by more than 300 coloured plates; the published price, however, £7 sterling, would no doubt much restrict its sale. Two other books, "Le Monde des Bois," and "Le Monde des Papillons," particularly attracted my attention; the latter, illustrated by 50 coloured plates and many wood-engravings, is well worthy of a place in the library of every naturalist. Many of the diagrams exhibited were also admirably got up, and were issued at a price so moderate as to be within the easy reach of all. Having completed my examination of this very interesting exhibition, I could not help feeling some regret that, with one solitary exception, English entomologists were unrepresented, a circumstance which I endeavoured to account for to those who made it a subject of remark, by the supposition that sufficient publicity had not been given to the preliminary announcement in England. And now, by way of conclusion to my paper, perhaps I may be permitted to state, for the further information of those interested in the matter, that the Société d'Insectologie Agricole was established in Paris in 1867, for the special study of those branches of entomology which are of practical importance to the agricultural and industrial portions of the community. Its affairs are conducted by a committee of thirteen, with the usual officers, and all persons desirous of joining are eligible for membership without distinction of nationality or residence; the annual subscription is fixed at 10 francs, in return for which, members are entitled to attend the meetings of the society and to receive such publications as may be issued by it. R. T. Lewis.

DOUBLE EGGS.

During one of our natural history explorations last year (1867) we found in a wood near Kule, Staffordshire, a blackbird's nest in which was *one* unusually large egg, fully as big as a pigeon's egg. The prize was carried away as a curiosity on account of its size, but shortly after, the shell being accidentally broken revealed a still greater marvel,—"a second egg within the first." This latter was *slightly* smaller than usual, had the usual colour-markings, and when blown was found to contain both "white" and yolk, the latter with a well-developed cicatricula.

At the time we supposed the discovery unique; but on referring to Hardwicke's Science-Gossip for 1867 we found no less than five similar instances recorded; all the eggs, however, were either hens' or ducks', no doubt from these coming under more frequent observation than other birds' eggs.

In each of these instances there seems to have been only one yolk, and that always in the *inner* egg. In one or two of the cases the inner egg was excessively small—the size of a wren's; these were, in fact, mere abortions, and of course no chicken could be hatched therefrom.

But in the double egg we discovered, both shells contained white and yolk in a perfect state, so that two chicks might have been hatched, as is the case when two yolks are contained in one and the same shell.

As George the Third marvelled how the apple got into the midst of a seamless dumpling; as Pope marvelled at the trifles found in amber—

> "Pretty! in amber to observe the forms
> Of hairs, or straws, or dirt, or grubs, or worms:
> The things, we know, are neither rich nor rare,
> But wonder how the devil they got there;"

so we marvel at double eggs! It seems as if one

had swallowed the other! Yet we believe the phenomenon admits of a very simple explanation.

It must be kept steadily in mind that only the yolk-bag and contents are developed in the ovary, and that the white (or albumen) and the shell are afterwards added to complete the egg during the transit of the yolk-bag along the oviduct.

Now, if from any cause an egg is detained for *an unusual length of time* in the oviduct, its walls are re-excited to action—a second "white" (varying in quantity in different instances) and a second shell are secreted around the first egg, and thus a double egg is formed; but the central egg only, in such cases, would be fertile. Our own example, as it contained two perfect yolks, will therefore require a modification of the foregoing explanation fully to clear up the nature of the process.

We must suppose a yolk-bag to have left the ovary of the blackbird, entered the oviduct, and there received, as usual, its "white" and shell, but was detained by spasm, or some other kind of obstruction, until a second yolk-bag entered the oviduct; this, urged on by the peristaltic action of the tube, would at length impinge on the egg in front. Now, its membrane being very extensible, and the *vis a tergo* still continuing, the first egg would after some little time be completely invested, though of course *not* in the cavity of the yolk-bag, just on the principle of a closed or double nightcap.

This investiture being accomplished, there only remains for the albumen and shell to be deposited in order to complete the double egg.

When two yolks are found in one shell, the explanation is as follows:—"Two yolk-bags become adherent, and so enter the egg-duct together, where they receive a common white and common shell." In this case the egg is unusually large, and there is no smaller end; so that a double yolk can be predicted beforehand.

Newcastle, Staffordshire. JAMES YATES.

THE HEART OF DAPHNIA.

THE great distinctive character which separates the Vertebrata from the Articulata is, without doubt, the attachment of the muscular system, in the one sub-kingdom to an internal osseous framework (*endoskeleton*), in the other to an external, jointed, and chitinous case (*exoskeleton*).

Next in importance to this, is the position of the circulatory and nervous systems. In the Vertebrata, the situation of the heart and large blood-vessels is ventral, and that of the neural system, dorsal. In the Articulata, this is exactly reversed; the heart being dorsal, and the chain of nervous ganglia ventral. Among the other distinctions between these two natural divisions of animal life may be remarked the comparatively incomplete or lacunar character of the circulation in the Articulata. Taking the Insecta as a type of the series, we find a long dorsal vessel or heart, lying bathed in the nutritive fluid, which enters into it by more or less numerous slits or openings opposite to each other, and which divide the heart into sections or chambers, corresponding generally to the annulations of the external case. The successive muscular contractions of these chambers propel the blood towards the head of the animal, and it finds its way back again through wide lacunar channels; or is vaguely filtered, as it were, through the various structures

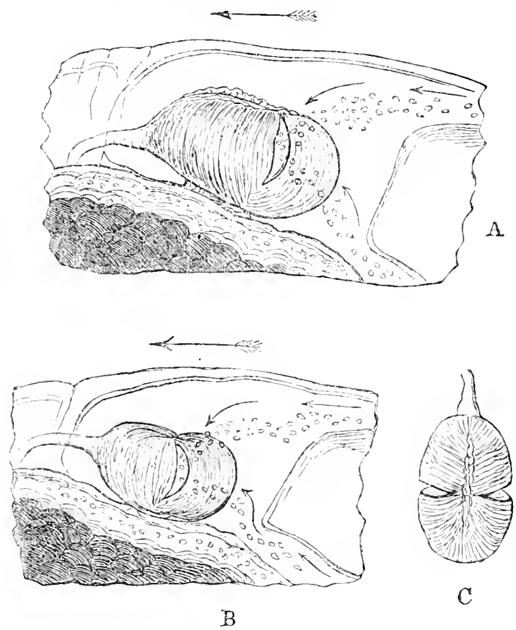

Fig. 220. Diagram of the Heart of *Daphnia* × 130.
A. *Daphnia pulex*. B. *Daphnia vetula*.
C. Dorsal aspect of the Heart of *D. pulex*.
The arrows above the figures point towards the head of the animal. The small arrows indicate the direction of the currents of the blood.

and organs of the body. In so vast a series as the Articulata, of course great variety is to be found in the completeness of the circulatory system; and it will be noticed that where there is a more local respiratory arrangement, as in the case of the higher Crustacea and the pulmonary Arachnida, the vascular provision is much more perfect; while in some of the lower forms of the sub-kingdom it is partly or altogether absent.

Several well-known and favourite objects will display, under the microscope, various parts of this circulation; but a sight of the typical *fenestrated* heart of an articulate animal, in full action, is not, I think, very common, nor in most cases easy to obtain; and the means of displaying this operation with tolerable certainty may perhaps be interesting to some of the readers of SCIENCE-GOSSIP.

Select a large and clean female of the common water-flea, *Daphnia pulex*, and place it in the compressorium, where it will be retained naturally on its side. The instrument should be so adjusted as to render the body motionless, with the carapace slightly flattened, but still giving it sufficient liberty to move its antennæ and limbs. Use a half-inch objective, stopped to an angle of about 45°. The illumination should be, at first, the paraboloid, with a fine light. The binocular arrangement is essential, and the lowest eye-pieces are the best to commence with. In examining the heart under these conditions, it is probable that the great rapidity of its contractions will interfere with any useful definition of its structure; but after a while these will become much less frequent and the difficulty will be removed.

By using the fine adjustment, the focus, or *plane of vision*, may be slowly moved from the nearer to the farther side of the heart; and if the instruments are good, the specimen of fair size and clean, and the arrangement of the light carefully attended to, the structure and action of the organ should at once be perceived. If this is not the case, the specimen should be changed, and other objectives, eye-pieces, and modes of illumination tried. Some care and patience will be necessary at first; but after once obtaining a good view of the heart of Daphnia pulex, those who have had, perhaps, some difficulty in seeing it with all these appliances will find that they can display the much smaller heart of D. vetula with a two-third or even a one-inch power.

It will be seen that the heart of Daphnia is homologous to two chambers or sections of the dorsal vessel of an insect; that is to say, it has one pair of vertical slits opposite to each other and approximating on the dorsal aspect. The blood, distinguished by its suspended corpuscles, sweeps round between the inner and outer surfaces of the carapace, and along the upper side of the abdomen, into the cardiac chamber, where it pours into the heart through the two slits or valvular openings. The muscular fibres of the organ are placed vertically, or somewhat like the meridians drawn on the artificial globe. The first part of the contraction closes the slits simultaneously, and its continuation expels the blood forward through a distinct anterior (arterial) vessel.

In Dr. Baird's beautifully illustrated and learned work on the "British Entomostraca," he says of the Daphniadæ,—"On the back, in the first segment of the body, we see an ovoid-shaped vesicle, possessed of very rapid contractions; this is the heart. According to Jurine, there springs from its anterior extremity an arterial vessel, which contracts in an opposite manner to the heart itself, curves immediately from its origin, and goes backwards, following the direction of the intestinal canal.

"Gruithuisen describes the heart and circulation at greater length. He says there are two hearts, one venous, the other arterial. The venous supplies the intestines and other parts of the body with blood; the arterial supplies the head and parts connected with it, its branches making the circuit of the shell on the anterior edge, and collecting near the posterior inferior part into one large trunk, which runs along the back of the shell, and returns to the arterial heart again."

I have not been able as yet to find any satisfactory description of this organ, and certainly no mention whatever of the wide slits opening and shutting, and, like mouths, swallowing in the corpuscles of the blood. I am led, therefore, at present to believe that this is the first notice of the fact. Its publication will, however, produce a quick and sharp rectification, should the assumption of its novelty be erroneous.

If it be found that nothing is said of the slits in the heart of Daphnia in the many valuable works treating on the Entomostraca, I shall be inclined to attribute the omission to a sort of learned contempt, felt and expressed by many naturalists, for the more efficient and complicated forms of microscopes. A late well-known conchologist assured me that "if he could see the lines on Pleurosigma angulatum, he was quite content;" and one of our most distinguished living naturalists, to my personal knowledge, persists in the use of a cloudy old triplet, with which he declares "he can see everything necessary to be seen."

The absurdity of this will be manifest to all who reflect that the countless varieties of microscopic objects require every possible kind of treatment and illumination; that at least all procurable means of observation should be always at hand; and that no instruments can ever be considered good enough, when we have to depend upon them, in the examination of a world as infinite in its minute structure as it is vast in its extent, and which we are compelled to believe is actually crowded with strange and wonderful things, the destined novelties of future ages, though old, perhaps, as the commencement of organic life, waiting in the sublime patience of nature to be discovered, but as yet unrecorded and unknown.

Kensington. H. C. Richter.

Oxalis named "Alleluia" (p. 210).—Before the Reformation in the Church of England, and in the Catholic Church at the present day, the word "Alleluia" was added to the Introits, Graduals, and other parts of the service, between Easter and Whitsuntide. It seems likely enough that the Woodsorrel was named "Alleluia" from its blossoming at that time; I have before quoted Gerarde as hinting at this explanation (Science-Gossip, iv. 52). It has also been suggested that the use of the Woodsorrel leaf by St. Patrick may have originated the name.—*B.*

THE HOBBY.

(*Hypotriorchis subbuteo.*)

THE genus *Hypotriorchis* was established in 1826 by Boie, and all the species belonging to it are very closely allied to the true Falcons (*Falco*). Indeed, as Mr. Harting justly remarks in his "Birds of Middlesex," the English Hobby is a Peregrine in miniature. The genus is cosmopolitan, representatives being found in the Old and New worlds; but, as I am writing on only one species, I must leave any further considerations on their geographical distribution to another opportunity. *Hypotriorchis* contains two sub-genera, both of which find representatives in the British islands, and may respectively be termed Hobbies (*Hypotriorchis*, Boie) and Merlins (*Æsalon*, Kaup).

So rare in most parts of this country is the Hobby that British ornithologists have had very little opportunity of observing its habits in a state of nature. During my residence in the north of England, where I devoted all my leisure time to the study of ornithology, not one instance of its occurrence came under my notice; and it was not until I went to live at Cookham, near Maidenhead, in Berkshire, that I saw my first British-killed specimen. There, in the beautiful collection of birds formed by Mrs. De Vitré at Formosa, I found a very fine specimen of the Hobby, which had been shot in Cliefden woods by one of the keepers. Doubtless it would have figured as a trophy along with other vermin (!) on some tree trunk, had it not fallen under the notice of Mr. Briggs, the head gardener at Formosa, to whose intelligence as a field naturalist not only myself but Mr. Gould can testify. Notices of the breeding of the Hobby in this country are rare, and I therefore make no apology for extracting from my paper, published elsewhere, the notes with which Mr. Briggs furnished me on its nidification at Billing-bear Park, where he was keeper some years ago, especially as it gives us a striking instance of the courage for which this pretty little Falcon has always been noted. "He had found a nest of this species in one of the plantations on the estate, and only waited till the young ones were fledged, to take them. Accordingly he mounted to the nest, and was immediately greeted with loud cries from the young birds. The male Hobby, hearing the screams of the nestlings, sailed over to the spot, and surveyed the scene of action from a considerable height. Suddenly, as

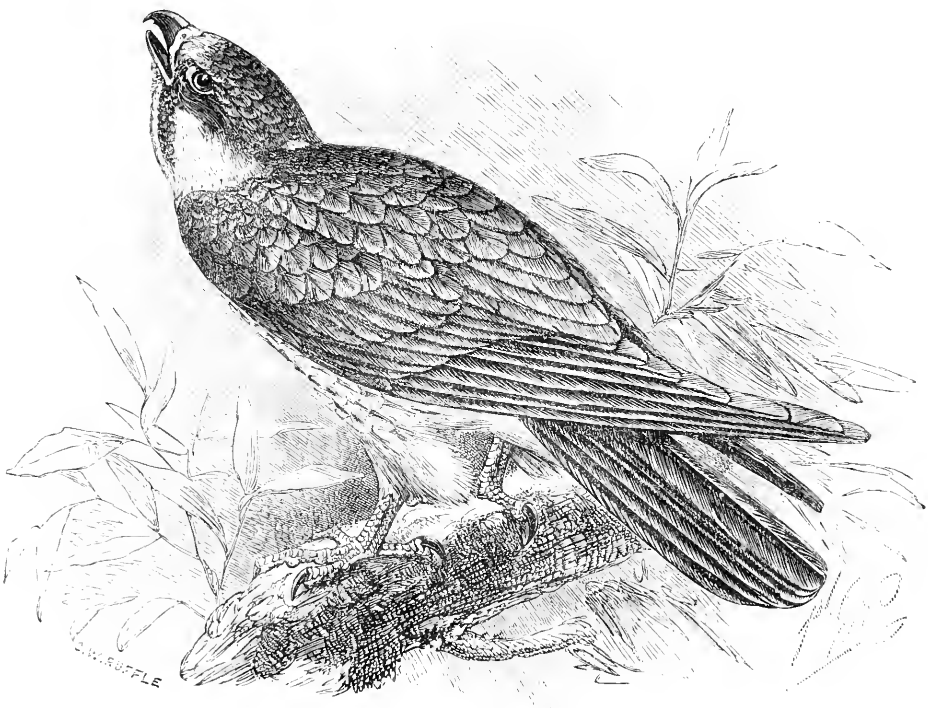

Fig. 221. The Hobby.

Mr. Briggs was preparing to descend with his captives, the bird darted down from above with immense velocity, his wings cleaving the air with a loud *whish-sh-sh* as he shot down to within a foot of the intruder's head, and then, carried up by the impetus of his descent, he mounted as swiftly as he had stooped, and only paused a second ere he recommenced the attack. This was renewed in quick succession as Mr. Briggs descended, causing in his mind no small apprehension lest the courageous bird should strike at his face. Having reached the ground in safety, and wishing to obtain the old bird, he carried the young into the middle of a neighbouring field, and, having made them scream, stood ready with his gun. No sooner did the parent-bird hear the young cry, than he again appeared, and from an immense height swooped at Mr. Briggs with the same astonishing velocity that had characterized his former descents. So sudden was the attack that there was no time to fire, and the bird ascended again like lightning. Would that I could now add that the Hobby escaped; but, alas! love for its nestlings impelled him to make one more stoop, and, in the midst of his next descent, the gun was fired, and the poor Hobby fell dead to the earth, like a thunderbolt."

Unlike the Merlin (*Hypotriorchis Æsalon*), which visits us in the winter, and seldom remains to breed, the Hobby is only a summer visitant, and as soon as winter approaches it takes its departure eastward. Mr. Stevenson gives June as the date of its arrival in Norfolk; but although the majority of the cases observed may have led to that conclusion, I think that it appears in this country much earlier in the year. The true breeding-place of the Hobby seems to be Southern Russia and the Crimea, and I subjoin Demidoff's notes on the subject, taken from his "Voyage dans la Russie Méridionale," vol. iii. p. 87.

"It is generally admitted that if the Hobby nidificates in Central Europe it is only of accidental occurrence; but in the Crimea and the rest of New Russia this is not the case; for everywhere where there is the smallest group of trees one may be almost sure of finding its nest, often taken from the Magpie and Crow. During summer it is observed on the steppes, especially in the neighbourhood of the sea or stagnant water, where the inhabitants of the air assemble to quench their thirst. There it is the terror of the different species of Larks, but especially of the Calandra, upon which it hurls itself from some hidden place, forces it to take wing, and then seizes it in the air. In summer it is the young and inexperienced individuals of this species of lark which suffer most, for the old birds are too wary to rise up; they, on the other hand, skulk on the ground, and, as the Falcon only seizes those that fly, they avoid the danger. This Hawk finds, moreover, a singular pleasure in following up birds much larger than itself, and, being unable to gain any advantage over them, tries all it can to harass and annoy them. The Numidian Cranes, for instance, are frequently exposed to its malice. Near the river Salghir, in the Crimea, I observed a pair of these Falcons mixing, in true mischievous spirit, with a troup of Cranes who were amusing themselves by a dance, and enjoying the cruel pleasure of falling, first on one and then on another of these peaceable birds, which proceeding seemed to divert them (the Hawks) exceedingly. A great many pairs of this species of Hawk build every year on the lofty poplars which border the Salghir, near Symphéropol."

By the above notice it would appear that the Hobby generally robs the Crows and Magpies of their nests, but does not always do so. Mr. Harting tells me that the general number of eggs laid is three. The Hobby is common in May upon the Southern Volga, whence a large collection has been forwarded to this country by Herr F. M. Moeschler, a well-known naturalist. Out of this lot are two fine adult birds in my own collection. The sexes are alike; and, from a number of specimens I have examined, I perceive only a slight preponderance of size in the female Hobby over the male.

The Hobby feeds principally on small birds, generally larks, and also on insects of various descriptions. Radde calls it the Lark-falcon, and records it as being met with on his journey through South and East Siberia; but he further says his specimen differs very much from European birds, and the same difference is exhibited in the eggs. (Can Radde's bird be *H. severus?*) As I stated above, Southern Russia seems to be the home of the Hobby, whence it migrates to the east, west, and south. To the eastward it was observed in Oudh in Sept., 1858, by Captain Irby (vide *Ibis*, 1861, p. 220), and it visits India in the winter. Mr. Blyth remarks that it "visits lower Bengal in the cold season, when it is far from common, and has been killed in southern India." Mr. Jerdon makes similar remarks, and says it flies about at dusk; and Mr. Blyth also tells me that he once shot a Hobby near Calcutta, in the winter, quite in the dusk of the evening, when he was out shooting bats. In China, also, the Hobby is found, according to Mr. Swinhoe (*P.Z.S.* 1863, p. 260), who has also observed it in Formosa. He records it from Tientzin, Hankow (Central China), Foochow, and Amoy, in which latter place he says "it is occasionally seen during the winter, but is rare." Schrenk also met with it in Amurland, where he procured examples similar to European specimens; and this is the farthest limit yet recorded, I believe, as it has not hitherto been met with in Japan.

Independently of its occurrence in South Russia, it has been recorded from every country in Europe, and is a regular summer migrant. Lord Lilford

says that "it is common in Corfu in spring and autumn. I have an immature specimen, which was shot by an officer of the 3rd Buffs, on the roof of Fort Neuf barracks at Corfu. I saw a Hobby near Cettinge, the chief town of Montenegro, in August, 1857." It also appears to be a regular visitant to Malta, according to Mr. Wright, who says (*Ibis*, 1864, p. 48), "it is not uncommon in spring and autumn. As is the case with all birds of passage, the Hobby is much scarcer in some years than in others. In the autumn of 1862 I could not obtain a single specimen." In Spain, Lord Lilford says (*Ibis*, 1865, p. 175) "the Hobby is not uncommon in Andalusia, where I have several times seen it, and is found more or less commonly throughout Spain during the summer." Mr. Gurney has recorded it from Beyrout, in Syria; and the Rev. H. B. Tristram says that in Palestine it is "another summer visitor, rather late in its return, confined, so far as we observed, to the wooded districts, and resorting to the olive-yards and open glades." Following the Hobby to its haunts in Africa, we learn from the same reverend gentleman that "it is migratory in the desert, halting in the Dayats, apparently on its passage south;" and the great Abyssinian traveller Heuglin states, in his paper on the birds of North-eastern Africa, that "the Hobby is sometimes seen in Egypt during winter; but it appears to be found there all the year through. I killed two old birds in the months of June and August, 1852, in Siut (Upper Egypt), and in Dongola." Mr. Drake also says, in his paper on the birds of Tangier and Eastern Morocco (*Ibis*, 1867, p. 424), "I saw this bird twice near Cape Negro." The Hobby even extends to Cape Colony, as we learn from Mr. Layard's recently-published work on the birds of South Africa. There the author records several instances of its occurrence, and adds, "Mr. Sclater writes, 'Never before received from south of the equator.'" Mr. Layard adds a foot-note: "This observation of Mr. Sclater's opens up a curious subject of inquiry. Have this and other species only lately found their way down the continent? Or have they escaped the notice of observers? I incline to the former supposition, as I cannot conceive that some of our common species should have escaped the notice of such men as Dr. A. Smith and Le Vaillant." I have quoted the above, as I find, from Yarrell's "British Birds," that it did *not* escape Dr. Smith's observation; for in his first volume (p. 43) Mr. Yarrell says, "Dr. Andrew Smith considers it as an inhabitant also of South Africa, in the vicinity of the Cape."

Thus, as the observations on the habits of the Hobby by British field naturalists are scanty, I have endeavoured, by collecting the notes of those who have observed the species in countries where the bird is commoner, to give some idea of its history, habits, and geographical distribution. Its geographical range may be stated briefly to be extended over the following countries:—

Europe; Malta (Wright); Siberia (Radde); Amur-land (Schrenk); China (Swinhoe); India (Blyth); Oudh (Irby); South Russia (Moeschler, Demidoff); Crimea (Demidoff); Syria (Gurney); Palestine (Tristram); North-east Africa (Heuglin); Sahara (Tristram); Tangier (Drake); Cape of Good Hope (Layard).

In India and South Siberia it meets with the range of another Hobby (*H. severus*), which latter species is found in India, Java, and the Indian Archipelago, being replaced in its turn by *H. lunulatus* in Flores, Amboina, Ceram, and Australia.

R. B. Sharpe.

Old Tree.—In the churchyard at Tisbury stands a venerable yew of immense size, well worthy of a place among the celebrities so pleasingly recorded by Mr. Spicer last month. The trunk, which is hollow, with a large opening towards the north, measures thirty feet six inches round. By a calculation made from the appearance of an exposed surface, it must be at least one thousand five hundred years old. Britton, in "Beauties of Wiltshire," says of it: "In the churchyard is a large hollow yew-tree 8 or 10 yards in circumference, from the roots of which, near the centre, eight young stems have sprung up, twisting themselves together in a curious form, and, at about the height of two yards, struck into the centre of the principal remaining trunk of the parent tree, the hollow of which they entirely fill up." Tradition tells that a former vicar, who, from motives of economy, used to pasture two cows in the yard, on one occasion lost them for three days, at the end of which they were found in the tree. I fear however, especially after what Mr. Britton says about the young stems, that the story needs to be received with caution. I regret to say that the tree is decaying fast, a great many roots having been destroyed about twelve years since, in lowering the level of the graveyard.—*A. G.*

Blechnum Spicant (p. 212).—I have found both the fertile and barren fronds of this fern bifurcated, the latter the more frequently of the two. I last saw an example near Llyn Dulyn, Carnarvonshire, in the neighbourhood of which grow *Allosorus crispus*, *Polypodium phegopteris*, *P. dryopteris*, *Cystopteris fragilis*, and many other plants worthy of notice.—*B.*

Eucampia Zodicatus.—Smith, in his synopsis of "British Diatomaceæ," vol. ii. p. 25, says that this diatom is obtained in the stomach of *Pecten maximus*. I have found it in the mud in Whitehaven harbour, sparingly mixed with other forms common to it.—*B. Taylor.*

MOLE MITE.

A MOLE was brought to me this morning, on which I observed numerous specimens of a species of Acarus that on examination I found possessed some characters not common, and therefore the accompanying drawings may prove interesting to some of your readers.

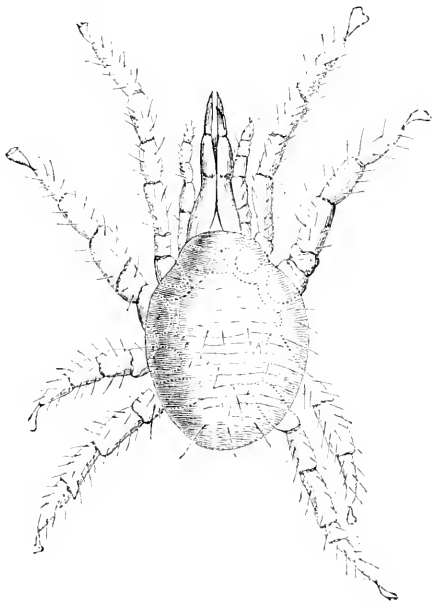

Fig. 222. Mole Mite.

Shape, oval; length ·06, breadth ·04 of an inch; colour, red; legs, 8; palpi, 2; body sparsely clothed with hairs, legs and palpi better provided.

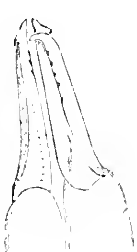

Fig. 223. Proboscis.

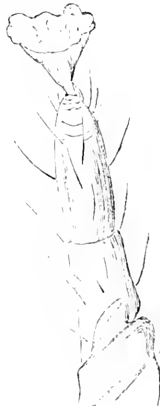

Fig. 224. Foot.

When alive, the intestinal canal distinct, and forming a handsome pattern throughout the body, which is divided transversely into two lobes; but these characters are not apparent after death takes place; the shell-covering of the hinder part of the body is divided into minute unequal hexagonoidal plates.

Proboscis double, flexible, and when fully protruded is more than half the length of the body. The extremity of each branch is provided with a horny claw: one mandible of each is curved like a bill-hook; the other is straight, and has a tooth or notch, upon which the curved mandible lies when closed. All the feet are trumpet-shaped suckers, extremely flexible. J. P. G. Smith.

"BLACK JACK."

A CORRESPONDENT inquires the name of the insect which is produced from the larva known as "Black Jack," and which is so destructive to turnip crops.

Fig. 225. Larva and mature male "Turnip Saw-fly." The latter enlarged to 2 diameters.

The "Turnip Saw-fly" is *Athalia spinarum* of Fabricus, belonging to the order Hymenoptera. It is the perfect insect of the larva or caterpillar known in agricultural districts as "Black Jack." A full description with figures is contained in Curtis's "Farm Insects," Chapter II., pp. 37–62, plate B. In some seasons these pests are exceedingly numerous, and in the Eastern Counties the "Black Canker," as it is called, lays waste entire fields of turnips. The year 1835 has been termed in these districts the "Canker-year," but fortunately in some years, especially after a hard winter, they are comparatively scarce, and occasion but little mischief.

"Folk Lore."—It is an article of "Folk Lore," in North Yorkshire, that if the ash leafs before the oak we shall have a very dry summer. Such was the case this year, and we have had a summer of almost unequalled drought.—*J. Ranson, Linton-on-Ouse, York.*

ZOOLOGY.

Sphinx convolvuli.—Just at the gloaming, in the evening of the 29th of August, I had the pleasure of seeing the beautiful and rare Unicorn Hawk-moth. I was walking in my garden, when suddenly I was aware of the presence of this fine Sphinx, hovering round a large scarlet geranium, against the individual flowers of which it hung in air for about a second over each in succession, its very long sucker inserted into the blossom,—so long, indeed, that the head of the insect was fully three inches away as it pumped up the grateful nectar. It shot off from plant to plant along the borders, rifling nearly every blossom on each before it tried another, manifestly preferring the petunias and the zonal geraniums, though many other plants were in flower. The insect remained under my observation for a full quarter of an hour in different quarters of the garden. It was so fearless, or so engaged in its nectar-draughts, that by a little precaution in my movements I could approach quite close to it, and bring down my face to within a foot from it, without at all disturbing it. I believe I could have easily caught it in my hand if I had really wanted it; I did very nearly grasp it, though only half in earnest. The end of my beauteous visitor was tragi-comic. I was eagerly watching it in the fading light, and admiring the bands of black and red and white on the abdomen, which were beautifully distinct and well defined, while the wings, from their rapid vibration, were mere shapeless clouds, when I saw that I was not the only admirer. A neighbour's cat was crouching under a bush close by, following the moth with her eyes as eagerly as I. Puss was stealthily creeping, *ventre à terre*, closer and closer to the unsuspecting prey, and though by voice and gesture I sought to frighten her off, she pertinaciously returned. At last I ceased, wishing to see the result; and puss made her spring, striking down the moth at my very feet with the utmost ease, closing upon it at the same instant, and carrying it off in her mouth behind the shrubs. I presently pursued; but in the deepening dusk I could find no trace of the moth, while pussy began to purr and to invite caresses, as cats often do when they have caught a mouse, evidently thinking that she had performed a praiseworthy feat. It was a rather ignoble fate for my noble insect visitor. —*P. H. Gosse, F.R.S., Sandhurst, Torquay,* Sept. 1, 1868.

A Phenomenon.—The other day Mr. Jonathan Fielding captured at Blackpool a specimen of the common blue butterfly (*Lycæna Alexis*), showing the distinguishing colour-features of both male and female in the greatest perfection. The wings of the female insect are of a dingy brown colour, with black shades and reflections, and have on each six crescent-shaped orange spots parallel with the hind margin; those of the male are purplish blue, without any spots or markings. The two right wings of the insect referred to represent the male, and the two left the female. It now forms one of a group in my cabinet.—*J. Thorpe, Middleton.*

Colias hyale and edusa.—I have seen eight or ten specimens of *Colias hyale* this year, and only remember having seen one some years since. Last year I saw one specimen of *Colias edusa*, but have seen none this season.—*S. Smith, Wisbech.*

Painted Lady (*Cynthia cardui*).—This erratic butterfly is very common this year. Numerous correspondents from distant localities announce the fact, to which may be added, that on one of the last days of August we caught three at one sweep of the net on the eastern coast. No, not the net,—it was our hat, for we had no net with us.

A Feline Entomologist.—A few days ago, in South Shields, in the county of Durham, a woman observed her cat running along the house passage with something in its mouth. On seeing this she gave a stamp with her foot on the floor, and to her astonishment the cat dropped out of its mouth a large moth, *Sphinx convolvuli*. This is the only specimen known to have been found in South Shields. It is now in the possession of Mr. Thomas Oates, chemist, of this town.—*Joseph Wright, South Shields.*

Sphinx convolvuli.—A female specimen of this moth was captured this morning in the neighbourhood of Darlington. The species is very rarely met with in this part of the country. It measures $4\frac{1}{8}$ inches across the wings, and, with the exception of a slight injury to the tips, is a perfect specimen.—*J. K., Darlington.*

Striped Hawk-moth.—Mr. John Taylor captured at rest on Sunday last a specimen of the Striped Hawk-moth (*Deilephila livornica*). This beautiful moth is a very rare visitor in this country. Most of the specimens in our cabinets are continental ones. The above was exhibited alive in good condition at the Middleton and Grange Entomological Society's monthly meeting, and consequently is a British specimen.—*John Thorpe, Church-street, Middleton.*

Rare Insects.—The following rare insects have been caught in the neighbourhood of Deal this year:—Two specimens of that rare Hawk, *Deilephila livornica* (Striped Hawk-moth); one was caught flying over a chalky bank near Walmer Castle, and the other in a potato field near Deal Castle. Two specimens of the Queen of Spain Fritillary (*Argynisis lathonia*) were caught between Deal and Dover, and a third was seen near Deal. The pale

clouded yellow (*Colias hyale*) has also been very abundant this year, while the common edusa has been rather scarce.—*H. C. Leslie.*

KINGFISHER.—Wanting a couple of eggs for a correspondent, I kept a watch up the beck, and set a friend to do the same. He soon brought me intelligence that he had found two nests, and I found another. One of them was built in a slight depression on the bank-side, such a one as might have been made by a horse's hoof. The eggs were laid on the bare ground, and the only covering was the overhanging herbage, which clothed the bank in great abundance. Two of the nests fell a prey to a "dafty," who sucked the eggs, and the third was destroyed by rats I thought. I never found or heard of a nest situated like the one on the Cam side.—*Jno. Ranson, Linton-on-Ouse, York.*

RARE SEA-ANEMONE.—The capture of a somewhat rare sea-anemone is perhaps worthy of record in SCIENCE-GOSSIP. Miss Mary Collis writes me from Ilfracombe, as follows:—"On Monday, the 24th instant, a lady staying here picked up a curious Zoophyte in Barricane Creek, and gave it to a woman who was then helping me to collect sea-anemones. It is, I believe *Peachia hastata*, appearing fully to agree with your description in 'Actin. Brit.,' p. 235." [Then follows a description, which proves the identification to be correct.] "The animal squeezes itself between the few stones in my temporary aquarium, contracts, and appears dazzled at the faintest ray of light. Just now, when, for better examination, I took away a pebble, it seemed most indignant. I am glad to find that you kept one six months, and I hope that I, with care, may preserve mine some time. I now intend to fetch a little sand for it." A day or two later Miss Collis adds,—"The *Peachia*, though still alive, does not seem particularly healthy, owing possibly to my being unable to find here any sand for it. The fine gravel which I have scraped up from the beach it will not even notice. I imagine that (being found so close to Woollacombe) it came originally from a sandy bottom, and was washed into the creek by Saturday's gale." The species is large, handsomely coloured, of abnormal form and habits, and in many respects interesting, and therefore I trust you will give a few lines' space to the above.—*P. H. Gosse, F.R.S., Sandhurst, Torquay.*

RED HOUSE-ANTS.—In answer to "H. F. M.'s" inquiry in last month's number of SCIENCE-GOSSIP, in reference to the destruction of the above-mentioned troublesome species of Ant, I should advise him to try Keating's insect-destroyer; and I believe, if he perseveres a short time, he will be fully satisfied with the result. Not very long since I was asked by a lady whose larder was overrun by these little pests if I could suggest anything for their extermination, and patterns of them were forwarded for my inspection. They were a very minute kind, the smallest I have seen, and without doubt the *Diploroptrum molesta.* (What the former term may mean I do not know, but from all accounts they were very much the latter.) I recommended the insect-destroyer, and soon after, when I had the pleasure of meeting the lady again, I was informed that its application had been quite successful. Another plan, too, that I know answers very well, is to spread stiff paper over with thick treacle or honey, and put it in the places where they are mostly found. It will soon become covered with them; and if once they set foot upon the treacherous paper, all hope of their return is lost; in vain is the effort to put the best foot foremost, for no progress is made, and as they keep lifting one leg after another, it puts one in mind of an awkward squad attempting to mark time. When a sufficient number are entrapped, of course they must be destroyed; and perhaps transferring them to the fire is as humane a method as any of taking that life which interferes with our comfort.—*F. H. Ward.*

BLUEBOTTLES (FLIES).—My vicarage is a new house, the site of which is taken out of a large field of grass which was this year cut as hay, and not used as pasture. We entered the house in the beginning of February last, and noticed that there were a few bluebottles in one or two of the empty rooms; and as the summer came on their numbers increased. About the kitchen there were large quantities of common house-flies, but the bluebottles seemed to congregate in the better rooms on the south and west sides of the house; and in my study, which is an upstairs room with two windows looking south and west, I found so many congregate that in July I began to catch them in the west window, and from July 26th to August 21st (omitting six days when there was a high wind, or it was inconvenient to catch them), in 21 days, I caught no fewer than 1,856. Had I caught them all over the house, that number must have trebled or quadrupled; but in that one window alone, the daily catch ranged from 27 to 259. From August 22nd to September 1st there were cold winds, and the numbers were so few as not to merit attention; but on the 2nd instant the heat returned, and with it the bluebottles, 280 being caught in the same window on that day; 155 on the 3rd; 50 on the 5th; and this day (7th) 121 before the sun shone upon the window. I may add that, although unmistakably bluebottles, their sizes are very different, varying from nearly the size of the humble bee down to that of the common house-fly (of which very few came to my study). My great difficulty is to account either for their numbers, or their partiality for my quiet study, no other houses being very near, and there being no attraction of any kind for them.—*H. O. S.*

BOTANY.

Isolation of Plants.—After a good night's rest at the comfortable little inn close by the foot of Ben Lawers, Perthshire, you prepare at an early hour to ascend the Ben itself. It requires a pretty stiff climb of at least two hours to reach the top, and during the late oppressive heat some little courage and strength of muscle were requisite to attempt it. From the summit, with a clear atmosphere, the view is most magnificent. But I am not going to speak of that in detail now; I want to point out the habitat of one of our rarest British wild plants, *Saxifraga cernua*, Drooping bulbous Saxifrage. From the topmost peak, turning towards the south, you see the head of Loch Tay, about eight miles distant, where the river Dochart through its rocky bed enters the Loch near the little village of Killin. Your descent is to be made in a straight line with this. It is no smooth road. Boulder heaped upon boulder in the wildest confusion. The appearance, however, is perhaps more formidable than the reality, and with a little care there is no danger. Immediately below the summit grows another rarity, *Draba rupestris*. It is not in any great quantity, but may be found by careful searching. Keeping to the left, you descend alongside an almost perpendicular escarpment of rock, and when about a hundred feet or so from the top, you light upon that treasure in the estimation of the botanist, the Saxifrage above mentioned. This is the only recorded locality in which it is found. The plant is in tolerable abundance, and not likely to be soon extirpated. On the day (July 23rd) I first beheld it growing there were not many plants in flower, but plenty with bulbs. The seeing of this small, delicate, beautiful flower cut off in its lonely retreat from all its brethren, cannot but awaken some strange thoughts in the minds of the most unobservant. Was this the place of its original creation, or did it spread from some centre in far-off Scandinavia? Were its seeds deposited here by chance, or is it the sole survivor of a larger colony of its kind which had spread and spread from their native home? Much remains for man to learn, much which he never can know in his present state. Descending a hundred feet more or so, you come upon another wilding, not perhaps so rare, but still more beautiful than *S. cernua*. It is the *Myosotis alpestris*, Rock scorpion grass, or Forget-me-not. Large spaces are almost covered with the bright green leaves and the vivid blue flowers of this plant, presenting a striking contrast to the surrounding *débris* of the mica slate, and affording one of the most beautiful sights imaginable. It is a perfect gem, seldom seen, I imagine, in its lonely habitation. But I must not weary the readers of Science-Gossip with a catalogue of one-tenth of the rare and interesting plants to be found on the different sides of Ben Lawers. I would only say, go and look at them yourselves, and if any love of Nature in her wildest or loveliest moods be yours, you will not be disappointed.—*R. W.*

The Tea-tree.—The Boxthorn (*Lycium barbarum*) belongs to the nat. ord. Solaneæ, and, although it is vulgarly known under the vernacular appellation of "Tea-tree," must not be confounded with the Tea shrub (*Thea*), which latter plant furnishes us with the tea of commerce. The generic name is derived from Lycia (in Asia Minor), some of the species inhabiting that country; the specific name is derived from Barbary, from whence the plant in question was introduced as long ago as 1696. Your correspondent W. C. C., p. 213, was quite correct in his conjecture that it came from a warmer climate than our own, the mean temperature of Barbary ranging between 70° and 80°, that of England being about 50°. This plant blooms continuously during the summer months, and in the autumn has ripe and green fruit, and flowers upon it at the same time. The fruit is of a brilliant scarlet colour, borne in the acils of the lanceolate foliage, forming perfect wreaths of green and scarlet, a most beautiful contrast, the warm scarlet being cooled down by the cool refreshing green. In the garden of the Royal Horticultural Society at Chiswick, there exists a fine specimen of this interesting shrub, which bears an abundance of fruit, some of the branches being borne down to the ground by its weight. Nineteen species of Lycium are described in the "Synopsis Plantarum seu Enchiridium Botanicum," an interesting work in the Latin, published in 1805, in which is the following specific description:—"*L. Barbarum* (Barbary), Stem procumbent, angular, simple, rarely spinose, foliage petiolate, elliptical, calyxbibid, lacinate, bidentate corolla villous at its margin, fruit oval." A variety of this plant (*L. barbarum*, β *Chinense*) was introduced to our gardens from China. This variety has the style longer than the pentandrious stamens, and on its introduction was commonly supposed to be the true tea plant of commerce. Although this idea is well known to be erroneous, the name is still retained. In 1865 I saw a plant with a little fruit upon it at the end of an old cottage in the pretty little village of Owston, Leicestershire. The plant is common in old cottage gardens in Yorkshire, but I never saw it in fruit so far northward. The present season being hot and dry, I suspect it will fruit freely in the southern parts of England, the circumstances under which the plant exists in its native country—viz., heat and dry winds—being very nearly imitated by the season we have lately had.—*F. W. Burbridge, Royal Horticultural Gardens, Chiswick, W.*

NOTES AND QUERIES.

Second Broods.—Your correspondent "A. Mathews" will find that in all hot summers more abundantly, and every summer more sparingly, a second brood of *Smerinthus Populi* and *ocellatus* appear. This also applies to very many species of lepidoptera.—*Yeend Duer.*

"Was it a Mosquito?"—I experienced a short time back the same incidents as your correspondent "H. M. H.," and, after repeated attempts, succeeded in capturing an antagonist who had alighted on my neck. On examination, it proved to be *Culex pipiens*, and I have not the slightest doubt that your correspondent's insects were of the same species. This insect has decidedly been more severe in its bites during the past summer, which leads to the inference that the long-continued drought may have something to do with it.—*E. J. Layton.*

Royal Fern.—This magnificent fern is found in great abundance at Lound, in Suffolk, growing 5½ feet tall. I do not know of its being found elsewhere near the Norfolk or Suffolk coast.—*F. R. M.*

Molluscs in Aquaria.—I have often put bivalve molluscs—such as large mussels, pholases, and cockles—into my aquarium, but they invariably, after a short existence, die, most probably from starvation. What food ought I to supply them with, and how give it to them?—*J. B. G.*

Privet Hawk (*Sphinx ligustri*).—My own experience quite agrees with Mr. O'Farrell regarding the unusual early transformation of the caterpillar of this moth. I took a dozen fine larvæ on the 31st July; on the 4th August I had seven chrysalides, and the remainder changed by the 10th. This is much earlier than I have ever found them to change before. I may mention that I found one of them feeding on dogwood. Is not this an unusual food-plant? None of my larvæ were afflicted with the peculiar disease mentioned by Mr. O'Farrell, and I have never observed it in any that I have had. A larva of the eyed hawk-moth also changed about the same time: this is much earlier than usual.—*W. Bradford.*

The Large Green Grasshopper (*Acrida viridissima*).—I had a fine female of this insect brought me near Watford on the 18th of July last. It was caught on an apple-tree by a farm labourer, and measured two and a half inches in length, and the antennæ were a little over two inches long. Thinking I should like to keep it alive for a short time, I placed it under a large glass. Not knowing what it fed on, I supplied it with some apple-leaves, the greater portion of which it consumed, rejecting the veins and ribs of the leaves. I kept it three days, but had little opportunity of observing it. It seemed to be an uncommon insect in that part, and was regarded as a great curiosity.—*W. Bradford.*

Hawk-Moths.—About a fortnight ago I had a Poplar Hawk-Moth (*Smerinthus Populi*) out of chrysalis, and was wondering whether the same thing had occurred to any one else. Your correspondent "A. Mathews" asks whether his friend's poplar hawk could have been from *last year's larva. I know mine to have been from this year's*, so I should think the same was probably the case with his. I am inclined to think that the emergence of the poplar and other hawk-moths at this time of year from the pupa, instead of remaining in that state during the winter, is not a very unusual occurrence, as a friend of mine told me yesterday that he had just had four privet hawk-moths (*Sphinx ligustri*) out of chrysalides, the larvæ of which had been bred *from eggs laid last May.* I also remember having myself seen the poplar hawk-moth at the gas-lamps in September.—*W. J. Smith, Worcester.*

Lime-tree Mites.—Last Wednesday, Aug. 5th, we found one of the lime-trees in the garden swarming with myriads of minute yellow insects, which were running about the trunk and branches, and were, in fact, all over the tree. At the bottom the ground was perfectly yellow with them, and they seemed to have dug in the earth just as ants do. In some places, where twigs were hanging down, they had swarmed at the end like bees. But the most curious thing was that they had woven an extremely fine web all over the trunk and larger branches, so closely that it made a perfect covering; and this web gave the tree the appearance of having been glazed. We took some of these creatures, with a piece of their web, into the house, and examined them under the microscope with Ross's quarter-inch (the inch power, however, showed them better). They are covered all over with great hairs, and appear to have a pair of pincers for jaws. We could not distinguish any eyes. Their web was a smooth entire membrane, with faint parallel lines; and between the membrane and the bark of the tree were a large number of minute oval cells, which we presume were eggs. By referring to Wood's "Natural History," we conclude that they belong to the family *Gamasidæ*, of the class *Arachnida.* The genus is, probably, *Leptus;* and in some respects they are like *Leptus autumnalis*, but not in all. In the first place, it is not red, but yellow (the illustration in "Natural History" gives the harvest-bug but six legs,—we presume that is a mistake); it is also rather like *Acarus farinæ* (flour-mite), but its head is more decidedly set on its shoulders, and the shoulders do not slant off into the head, as in the flour-mite. We discovered them in sunshine. The next morning, at about half-past seven, we went to look for them in the rain, but they were all gone, except a few on the ground at the bottom of the tree; but they made their appearance again with the sunshine. They came at first quite suddenly, as they were not on the tree a few days before. They confined themselves to lime-trees, one or two other lime-trees in the garden being visited by them. How can their sudden appearance be accounted for?—*A. B. C., Croydon*, August 11.

[For an account of these sociable mites, see Science-Gossip for 1867, p. 125. The species is, perhaps, *Tetranychus tiliarius.*—Ed.]

The Privet Hawk-Moth.—In reply to "E. S.," the larva of the privet hawk-moth is not unfrequently found on the holly, a fact known to most entomologists. Its food may be arranged thus:—the privet, the lilac, the ash, the holly.—*George Gascoyne, Newark.*

Plague of Flies.—On Monday, August 24th, an unusually large shower of flies took place at Saltburn-by-the-Sea, Yorkshire. The swarm amounted to several thousands, and dispersed itself over the masses of decayed seaweed which were on the shore at the time. I should like to know if this was anything unusual.—*H. G. Woodford, Gravesend.*

Ostriches incubating.—The more I consider, the more I am surprised to find the extent to which vulgar ideas, fancy, and tradition lead us, even against our own inclinations. I have positively been constrained to believe the absurd idea that ostriches, having dug about five holes in the sand, proceed to lay an egg in each, covering them over with sand, leaving the sun to hatch them. And, unless your enlightened correspondent had thought fit casually to mention the fact that she not only arranged her eggs in a triangle, but "sat upon" all but two or three unfavoured ones, to whose unfortunate existence she makes an end in order that the ultimate chicks, whose favoured eggs have had the good fortune of being well sat upon, may have full beaks, I should still remain in perfect ignorance of such a sublime process. I must also suppose that during parturition the poor hen must increase in bulk to almost the size of the far-famed Arabian Roc in order that she may sit upon twenty eggs, of at least four inches of diameter to each, if the sagacious bird (which I must suppose she is) had sense sufficient to arrange all her eggs with their points upwards.—*C. L.*

Harvest Mites.—Will any of the readers of Science-Gossip who have studied the nature and history of the little animal commonly called the "harvest-bug," or "harvest insect," favour me with some account of its appearance as seen under the microscope, its structure and habits? and if any means of destroying the animal before it has wrought out its fell designs on the poor human being who encounters it could be added, it would be a boon indeed. My own present experience of its attacks is most distressing. In former years, when in the country, I have suffered much from their ravages, but of late I have not come in their way. A fortnight ago I came to a country lodging by the sea, and for the first four or five days confined my walks to the sands. During that time no insect attacked me. But then I bent my steps countryward, and ascended a little hill behind the house, my pathway lying between potato-grounds. On my return I discovered a little hillock on my flesh, and seated on it a small scarlet creature, with whose aspect I was but too well acquainted. Soon another and another appeared, and by the evening of the next day I had from fifty to a hundred of these horrible little brutes sticking in my flesh and making me rend it in such anguish of mixed smarting and itching as I cannot describe. In the course of the second or third day the suffering abated, and by the sixth I had pretty well recovered from the attack. That evening—which was that of Saturday, the 15th August—I visited some friends, and walked round their garden, orchard, &c. That night I was again assailed, and in the morning counted forty new hillocks of suffering on my chest and shoulders only. By the next evening (Monday) the number increased to seventy-four countable ones, besides many that were in such clusters as to be *un*countable, and that on the front of the neck, throat, arms, and shoulders only, a more than equal number being scattered about elsewhere, the nape of the neck being an especially crowded situation. I began to think that I had mistaken the cause of my suffering, and that I must be the subject of some eruptive disease, but on taking a lens I saw that on every mound sat a scarlet-coated enemy. I have vainly tried to kill or dislodge them. I have put lumps of wet carbonate of ammonia on them, and drops of glycerine, but without success. I have tried to remove them with a fine needle—with scissors. I have attacked them "tooth and nail," in front and in rear, all alike in vain. The body of the insect moves backward and forward as you push it, but the head remains buried in the flesh, and, as I believe, remains there until the animal dies—a deliverance which appears to occur about forty-eight hours after its first grip is taken. So far as I have been able to see with no higher power than the lens of a good "linen-viewer," the insect appears to be without legs, and not unlike in form to a narrow planaria, with a tough flea-like skin that resists pressure, of a brilliant red hue, and with a *small* black eye—it may have two, but only one was visible. The creature I examined was the only one that I succeeded in dislodging, and I could make nothing of the head: perhaps it had been partly broken off. The special questions I would ask are:—Whence does it come? How, if without wings or legs, does it effect its lodgment on human beings? How is it that for two or three days after the first attack, the numbers increase so rapidly, and that they so congregate in clusters? Is there any means of prevention or cure? The harvesters, and others around me, are sorely troubled by this nuisance, and it would be a wide-spreading benefit if a remedy for it could be suggested.—*M. D. P.*

Blechnum spicant.—In answer to Mr. Davies's query respecting the "sporting" of this fern, I beg to say I have found a bifurcate fertile frond, but only in one instance, in which it was divided about two inches down, and I thought it the result of an injury. I also found near Christchurch, Hants, a plant of *Blechnum* in which the majority of the fronds, both fertile and barren, had deeply serrate pinnæ. It grew on the edge of a ditch, and was extremely luxuriant. The difference in length between the fertile and barren fronds was scarcely so noticeable as usual. Many of the barren fronds were over twenty inches long, and one fertile one reached thirty-two inches, of which the stipes was eight inches. I sent a notice of it to Science-Gossip at the time, but was told to make sure of the species. I am quite sure it was *Blechnum* (one can't very well mistake it), and several friends have since verified two herbarium specimens I have of it.—*Geo. Edey, Rochester.*

Insects on Ferns.—The insect described by your correspondent "A. A." is unquestionably the Thrip. It is one of the greatest pests that can gain a footing on plants of any kind. The larvæ and pupæ are of a dullish white, but the perfect insect is jet-black. This insect attacks plants by piercing the under-side of the leaf, and in the same manner the fronds of ferns. If your correspondent has not many ferns infested by thrips, they may be removed by a damp sponge, to which they will adhere, on the sponge being drawn over them, care being taken not to injure the fronds in doing so. If very much infested, the best plan would be to smoke them in a case, frame, or room, until not a frond were visible. If this course is adopted, the fronds of the ferns must be quite dry. To prevent their attacks next year, keep the atmosphere about the ferns more moist.—*George Newlyn.*

Bifurcated Fern Fronds.—In reply to the query of "T. Davies," on page 187, I am able to inform him that this "sporting" is not confined to the two species mentioned by him. This summer a rootstock of *Asplenium filix-fœmina* growing in my garden produced two bifurcated fertile fronds.—*J. B., Chester.*

Spider Poison.—When Mr. Graham Ponton charges me with impugning, not the truth of his assertion, but of his observations on this point, I think he shows himself to have an exceptionally thin skin, which I am surprised has not been pierced by some large English spider. The assertion was as follows:—"Certainly no English spider is capable of inflicting a bite sufficiently hard to pierce the human skin; this I have frequently proved by experiment." I can only congratulate myself upon having in this matter a more favourable experience than Mr. Ponton, though by no means a pleasant one. I would remind Mr. Ponton that because no English spider has pierced his skin, it is not certain evidence of their inability to do so, while my hand has been bitten in the manner described; but I think the article in August number of Science-Gossip, p. 189, headed "Spider Poison," bears out the remark that Mr. Ponton was in error—inadvertently, I believe, but not the less in error—when he wrote that no English spider is capable of inflicting a bite sufficiently hard to pierce the human skin.—*F. R. M.*

Dreissena again.—I notice in your July number that "T. G. P." wishes for information respecting Dreissena polymorpha. I can supply a few facts, but cannot give the dates. I think it must be thirty years since, when in a boat searching along the sides of the lesser Nene, which runs through the town of March, I found the young fresh shells attached to the flags, from three-eighths to half an inch long. I never found them in that way after that year, but found them afterwards adhering to a wall, one and a half inch long, and nearly (in one instance) one inch wide. I have since found them in a large drain, six or seven miles from Wisbeach, by thousands, and, though the drain has since been cleaned out, I believe they are still abundant.—*Samuel Smith, Wisbeach.*

Dreissena polymorpha.—Would some of your Irish correspondents be so good as to inform me if this mollusc occurs in Ireland? I should likewise be glad to know if it is found in Wales?—*T. G. P.*

Dreissena polymorpha is very abundant in this neighbourhood, in the Dee, and Mersey, and Chester and Ellesmere Canals. It is found in clusters attached by the byssus to the brick and stone work, &c. Young ones are also found occasionally adhering to the rushes, singly, upon the banks, just beneath the surface of the water.—*C. Mills, Chester.*

Imbedded Lizard.—An extraordinary curiosity in natural history has just been discovered (writes a correspondent) at Mr. Brown's iron-mine, Brixham, Devon. A shaft, 74 feet deep, has been sunk, and whilst one of the men was at work he dug out a large piece of ore, and on his breaking it there crept out of it a living lizard, upwards of six inches in length. Its belly was of a yellow colour, and its back was brown. The ignorant fellow who brought this phenomenon to light seized the little reptile and crushed out its life. There is no doubt that this little creature must have been imbedded in this living tomb several centuries.—*Torquay Directory*, Aug. 12, 1868.

Dead Sea.—"W. H. R." inquires, "Are there any fish in the Dead Sea?" W. F. Lynch, in his narrative of the U. S. Expedition to the Dead Sea, writes:—"The mysterious element on which we floated, and which alone, of all the works of its Maker, contains no living thing within it."

Parson-bird.—I have seen an absurd statement by T. P. Barkas in Gossip for April, and, as I live with thousands of Tois about me, I asked a lad, who is an accurate observer, to write out the following for you:—"The Toi, or Parson-bird, is a black bird, and has two small white feathers under its neck. It mostly feeds on the fuchsia-berries, and sometimes on the mero-berry, and it picks small stones from the river-side when the bush is near the bank; it also likes the honey of the flax-bush. It is a very good singer, and when it builds a nest, it builds it on very high trees. The Toi is very good for eating, and when a hawk tries to take one, it makes a kind of noise, and all the others come and fight with it until it lets go." The "mero" is the white pine of New Zealand.—*J. H. L. Ralfe, Okaiito, West Land, Canterbury, N. Z.*

Fossils at Walthamstow.—Any of our readers who are making a collection of fossil land and freshwater shells will be glad to learn that they are to be obtained in great numbers at the excavations for the new reservoirs at Walthamstow, five minutes' walk from Tottenham Railway Station. The beds are of recent and post-pliocene age. The fossils are in excellent preservation.—*R. E. O.*

"Devonshire Ferns."—Observing that some of your readers are interested in the whereabouts of the *Osmunda regalis* in Cornwall, I take this opportunity of informing them that it is to be found in great abundance in many of the woods and marshes in this parish (Beerferris), and that at Rumleigh, also in this parish, there is a lane about fifty yards long, in which nine species of ferns are growing; and in the adjoining woods the *Osmunda regalis* in great luxuriance.—*M. Kent.*

Bifurcated Ferns.—I have a frond of *Polypodium vulgare*, bifurcated two and a half inches from the top; the peculiarity about it is that the central axis is prolonged for an inch beyond the division. This I have not noticed before.—*E. Ll. H. Fox, M.D., Broughton, Winchester.*

Gold-fish Hatching. (Reply to X., Edgbaston.)—The supplies of food for the parent gold-fish consisted of meat (beef and mutton), cooked or otherwise, and given about every other day in small pieces, such as the fish could easily swallow. The aquatic plant I have found succeed best is the *Valisneria spiralis*, but in the aquarium where the young fish are hatched there happened to be only a small bulb of the common white water lily.—*W. O.*

Tea-tree.—In answer to "W. C. C.," concerning the fruiting of the Tea-tree, I have one growing in the open road, now covered with berries.—*J. Perrin*, 71, *De Beauvoir Road, Kingsland.*

Second Spring.—Following the tropical summer which we have just experienced we have now almost a second spring. To-day I found a blackthorn, which had been completely denuded of leaves by the heat, in full flower and leaf. This is somewhat remarkable, as the flowers ordinarily come first. Many other trees and plants whose leaves had fallen are now again putting forth leaves and blooming. Larches which three weeks ago were as bare as in the depth of winter, are now covered with green shoots, and fuchsias which had entirely lost their leaves are now in full foliage and beginning to flower.—*L., Lynn Regis.*

Pleurosigma angulatum.—I have lately taken several gatherings of this form for examination, and on one occasion was pleasingly entertained with a revelation which I did not expect to witness. In the instance referred to, I noticed a vigorous and peculiar motion in several frustules. This movement was unlike any other that had before come under my observation. It appeared like trembling waves of extremely minute granules, which sometimes flowed in a general stream towards the centre, then, after a short rest, in the opposite direction; while at other times, for brief intervals, it flowed both ways at once, viz., up one side and down the other. The action was not present in all the specimens, but in a great many that I examined. All the frustules that exhibited it were perfectly still, except in one instance, so that I have no doubt of its having been within them. I shall be glad to know if any other reader of Science-Gossip has been fortunate enough to see this movement.—*B. Taylor.*

Local Names.—It is desired to collect as many as possible of the local names of British plants; and the assistance is requested of all who take an interest in the subject, or who may have the opportunity of ascertaining and recording them. Any lists sent to Mr. James Britten, High Wycombe, or to Mr. Robert Holland, Mobberley Knutsford, will be thankfully received and acknowledged.

What's in a Name?—While staying at Hastings lately we met a man carrying about a number of hedgehogs, I suppose for sale. When we stopped to inspect them, and called them hedgehogs, he indignantly assured us that we were quite wrong, for that they were "Abyssinian Porcupines."!—*A. G.*

"Folk Lore."—Onions.—It is firmly believed in many parts of Yorkshire that a sliced onion destroys infection; and I have known several very respectable and well-educated families who, in cases of fever and other infectious diseases, have caused a plate of sliced onions to be placed daily in the sick-room. When removed, they were carefully destroyed, from a belief that if any person accidentally used them, they would have the disease. The onions are so powerful, it is said, that they draw the infection to them, and absorb it.—*Jno. Ranson, Linton-on-Ouse, York.*

Cuckoo Incubation.—A correspondent asks, in your July number, if there are any recent cases known of a cuckoo rearing a brood of her own. One day in May last I was sitting among rocks in a bare "gill" between two of the bleak hills of this district (Moffat), where not a tree nor shrub nor root of heather could be seen, when a cuckoo alighted on the point of a crag, and three smaller birds fluttered about her, following her closely. As far as I and my companions could see, they were young cuckoos, for they seemed to resemble her in everything but size, which in their case was about that of a blackbird. Could we be mistaken in supposing this to be a cuckoo, and her family reared by herself?—*A. S. T.*

Prizes for Fungi.—At the meeting of the fruit committee (Horticultural Society) at South Kensington, on October 6th, two prizes of the value of three and two guineas respectively will be offered for the best collection of edible fungi.—*Gardener's Chronicle.*

Diseased Gladioli.—I enclose a small microscopic fungus of interest to me because I believe it to be connected with the Gladiolus disease, which has made great ravages this season. Some of the plants have withered very early, without shewing any signs of the cause. Others have developed the inflorescence, but have been arrested in the very act of blooming; these latter certainly shew a mycelium. The fragment sent is a portion of the spathe of the top flower of a spike which bloomed and appeared quite healthy till this morning. If you think any information may be gleaned about it by directing the attention of the readers of Science Gossip to the subject, I shall be glad if you would do so, as the small quantity I grow, and the very small part affected that has arrived at maturity, render it unsafe to assert that the fungus really is the cause of the disease.—*A. G.*

[The fungus is a species of *Mucor*, and doubtless the result of decay, not the cause of disease.—Ed.]

Plumules.—I cannot account for "J. A. S." not being able to find *plumules* in the male of the Large White *Pieris brassicæ*, unless all the specimens were very much worn, in which case I should have expected to find some at least, or (what I can scarcely imagine) he has examined *females* by mistake. In every case, and I have tried scores of specimens either taken on the wing or reared from pupæ, I have found plumules present. Since the appearance of "J. A. S.'s" query every male I have been able to catch has had the distinctive plumule. I should therefore be greatly obliged to "J. A. S." if he would forward me a fore-wing of one of the *males*, in which he has failed to find plumules, and I shall have great pleasure in forwarding to him, either direct, or through the Editor, an example of a male in which the plumules are abundant. All entomologists are aware that the male of the Large White is without black spots near the middle of the upper surface of the fore-wing, having two black spots on the under surface only, while the female has two such spots on both surfaces of the fore-wing.—*T. W. Wonfor,* 53, *Buckingham Place, Brighton.*

Tea-tree (W. C. C.).—There is a Tea-tree (*Lycium barbarum*) at Stowmarket, Suffolk, many of the pendulous branches of which are this autumn richly jemmed with its exquisite fruit; and I remember seeing another also in the Eastern counties, producing berries, though I think in less quantity than that growing at Stowmarket.—*F. T.*

The Tea-tree.—We have received so many communications on the fruiting of this plant under ordinary conditions that it is impolitic and impossible for us to publish them all. The evidence is strongly in favour of the conclusion that fruiting, though not universal, is not so uncommon a circumstance as was at first supposed.

Dorsal Fin of Gold-fish.—One of the gold-fish in my landlady's aquarium has no dorsal fin, only a slight boss on the centre of the back. Another has the posterior half of the dorsal fin wanting. They are "hot-water" fish.—*W. H. D.*

Cockroach in Bread.—Permit me to ask P. F. N. why he *gratuitously assumes* that his cockroach (page 215) had been incorporated with the dough, and survived the heat of the oven. Every one knows that the heat is too great for animal life to continue, being often considerably over the boiling-point of water.—*W. H. D.*

NOTICES TO CORRESPONDENTS.

F. Smail (Jedburgh).—Your *Polygonum* is the form of *P. convolvulus* referred to in *Bab. Man.*, ed. vi. p. 296, as having the "perianth winged, when the plant is often taken for *P. dumetorum*."—*B.*

J. H.—Eggs of a moth, probably the "Lackey," *Bombyx neustria.*

G. B.—The moss is *Cinclidotus fontinaloides.—R. B.*

R. A.—No. 1. *Bryum cæspiticium*, male plants. No. 2. *Fissidens exilis.—R. B.*

A. J.—No. 1. *Hypnum chrysophyllum*. The other is *Diphyscium.—R. B.*

E. C. B. (Portland.)—*Weisia controversa*, and not *Weissia commutata*, as stated in last number.—*R. B.*

W. E.—There is no English edition of Blanchard's "Metamorphoses of Insects."

H. M. M.—The average temperature varies a little every year, in some years more than others; the friend who told you that it was permanently 50½ around London should be sent to Coventry.

F. W. B.—Most probably the Privet Hawk-moth (*Sphinx Ligustri*), but the sketch is too rough for certain identification.

Oak Spangles are described and figured in Science-Gossip for 1866, p. 228.

J. R. M.—The white bodies on sandstone are the eggs of the stone mite, *Trombidium* (*Tetranychus*) *lapidum*. See Science-Gossip for 1867, p. 126.

Errata.—In our last number (p. 210), "Abnormal Foxglove," the word "bracts" is three times printed "tracts." The P. D. thinks the paragraph must have been "set up" on Saint Monday.

B. T.—Incrustation of carbonate of lime.

J. B. (Leeds.)—We will not hazard naming objects from description only.

J. H. R.—White Plume-moth (*Plerophorus pentadactylus*).

G. S. B.—If you want descriptions of the perfect insects which are evolved from the larvæ known as the glowworm, consult "Stephens's Manual of British Beetles," p. 187, under *Lampyris noctiluca.*

W. G.—We have several times received the dendritic spots on paper, and cannot give any satisfactory account of them. They do not exhibit organic structure.

C. D.—There is nothing at all uncommon in your pods or notice.

H. S.—As secretary to a naturalists' society, you should be careful in writing scientific names, and when quoting two, not to spell them both wrong. Your remedies are old ones.

M. J. W.—Warne's "Fern-book for Everybody" gives instructions for raising ferns from spores. See also Science-Gossip for 1866, pp. 46, 96.

T. P. B.—Offer declined with thanks.

J. H.—The shells of *Spirorbis nautiloides*, very common.

F. R. M.—The black caterpillars of the turnip, called "Black Jack," are the larvæ of a Hymenopterous insect, the Turnip Saw-fly, *Athalia spinarum.*

L. E. W.—No. 1. Possibly *Grateloupia*. 2. *Desmarestia ligulata*. 3. *Ectocarpus*, species indistinguishable. 4. *Enteromorpha*, species indistinguishable. Such specimens are not worth the trouble of collecting.—*W. H. G.*

R. (Strand.)—No. 1. *Polysiphonia*, sp. 2. *Sphacelaria scoparia*, autumnal state. 3. Decaying *Callithamnion*. 4. Possibly *Gelideum corneum*. The remark above applies also to these specimens.—*W. H. G.*

M. K.—Seedling of *Polystichum aculeatum.—J. G. B.*

J. F. C.—Certainly appears to be a new and singular variety of *Cystopteris fragilis.—J. G. B.*

S. H.—It is not likely that a specimen of *Myriotrochus Rinkii*, or the wheel-plates, can be purchased in England. The locality is Greenland.

W. H. P.—Covers for binding Science-Gossip can be had at the office for eighteenpence, or through any bookseller. Any bookbinder would bind them.

A. E. B.—Inquire of W. R. Tate, Esq., Grove Place, Denmark Hill, London, who can doubtless assist you.

J. C. D.—No. 2. Orange-growth on stone is *Chroolepus aureus*, a species of water-weed, or alga.

G. T. P.—Most probably your "nigger bread" is made from the meal or grated root of the manioc, *Jatropha manihot*, much used as food in tropical countries.

W. H.—We don't think that anything could be done in the matter, as the authority is quoted, though part is omitted.

T. W. W.—We will endeavour to discover the cause of the anomaly. It is apparently a riddle worth solving.

Bifurcated Ferns.—As the query is now fully answered, we cannot spare room for further replies. Thanks to all who have sent communications.

T. H. G.—Exposure to the air, and keeping the specimens absolutely dry, is the only cure for mould amongst dried plants.

W. W.—Second-hand geological books may be had of Wheldon, Great Queen Street, London, W.C.

M. D. B.—Should see Collins's Binocular Dissecting Microscope.

D. does not name the plants; the drops may be condensed from evaporation.

G. S.—Camphor, turpentine, or benzine, and exposure to the air and sun, of all furs and woollens.

EXCHANGES.

Plants from the Alps and Pyrenees for rare British Mosses or Lichens.—T. H. W., Garrybank, West Hill, Upper Sydenham.

Orchids, and other plants from the Surrey Chalk Hills, for local British Plants.—Send lists to W. R. Hayward, Heath Villas, Penge, S.E.

Ludwigia, or *Isnardia palustris*, *Tordylium maximum*, *Sesile libanotis*, *Peucedanum palustre*, wanted for *Saxifraga cernua*, and other rare Highland plants.—R. W. Westward, Wigton.

Humming Bird, and Silver Y Moths, Dried Ferns and Seaweeds, offered for named cuttings of Garden and Greenhouse Plants.—Cllanthe, Post Office, Teignmouth.

American Diatoms (mounted) from North Bridgton (2), South Bridgton (2), Beddington, Albany, and Waterford, Maine, U.S., for mounted British Diatoms.—A. G., care of the Editor.

Diatoms (mounted) from Perley's Meadow deposit, Bridgton, Maine, U.S., in exchange for other good mounted objects.—"Portland," care of the Editor.

Diatomaceous Deposit, from Cherryfield, Maine, U.S., in exchange for good mounted objects.—B., care of the Editor.

Membrane of Bat.—Wing membrane of Madras Bat, (mounted) for good entomological object.—M. C. C., 192, Piccadilly.

Spicular Sand from base of Neptune's Cup sponge from Singapore, for unmounted objects.—W. W., care of the Editor.

Mosses.—*Hypnum imponens* and *Trichostomum littorale*, for *Tayloria serrata* or *Diltonia splachnodes*.—E. M. Holmes, 2, Arundel Crescent, Plymouth.

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WHAT IS DARWINISM?

THE answers to this question have been numerous and contradictory, but the two which have gained most favour with the opponents of Mr. Darwin, are first, that Darwinism is a mere revival of the doctrines of Lamarck, and of the "Vestiges of Creation;" and second, that it is "a form of modern scientific infidelity." To the first objection, it may be replied that though several development theories besides those mentioned have preceded Mr. Darwin's, yet none have been brought forward fortified by so many undoubted facts and such skilful reasoning. In answer to the theological objection, it need only be said that it would be easy to show that Darwinism by no means affects the doctrine of a special Providence, and that many of the facts on which the theory is based are quoted by the natural theologian in his own favour. But when any discussion between science and religion arises, the arguments used seldom carry much weight to the other side, as bearing the impress of special pleading. Our object not being to defend Darwinism, but to gain some idea of its leading principles, it will not be necessary to notice further any general objections which may have been urged against it.

Darwinism is one of those philosophies which teach that all the various forms of organic life around us have not originated by special creation, or, in other words, by the direct miraculous interposition of the First Cause; but by the gradual action of secondary causes on previously existing organisms, and it seeks to explain what these causes are, and their modes of operation. Every object which is sufficiently material to fall under our observation at all, is subject to the action of innumerable secondary laws, the investigation of which is fully within our province; and the growth and variation of animals is no exception to the rule. But we cannot reach the ultimate causes of anything; and as science progresses, she continually finds that the effects which she had in her ignorance supposed to be produced by ultimate causes, are the result of ascertainable laws, the origin of which appears to have receded to the same distance as before.

It is admitted by all that animals and plants are subject to variation to an unknown extent; and the only question at issue between Mr. Darwin and his opponents, is the limit or non-limit of variation.

The number of species now existing in the world is enormous; for example, the number of species of beetles, alone at present recorded, cannot be much fewer than 100,000; and in all probability not one quarter of the whole number at present exist in our collections. Larger animals do not present so vast a number of species, nor are they so prolific or so abundant in individuals. But Malthus and others have satisfactorily shown, by arithmetical calculations, that at the lowest rate of reproduction, supposing that no obstacle to increase existed, there would in a few years be no standing-room in the world for the descendants of a single pair of any one species. A vast amount of extermination of species as well as of individuals has been continually in progress, from the earliest period of which we have any geological knowledge to the present day. It is true that the extermination of those species whose disappearance has fallen under human observation, has been effected mainly by human agency; but this cause could not have operated, of course, in the earlier geological periods.

Variation generally receives a great impetus from domesticity. Hence it is that in our domestic animals we frequently see changes taking place in a few years so great that they would require an

indefinite period to occur in nature. An animal or plant, when domesticated, is inevitably placed in circumstances differing more or less from those under which it has existed in a state of nature. If it is capable of existing in domestication at all, slight modifications which may or may not tend to assimilate it to its new conditions are nearly sure to occur. If the variation was beneficial to the domesticated species, it would be reproduced, while the original wild form would disappear, in domesticity; or if it varied so as to become more useful in any way to the owner, it would be preserved, while the individuals which did not vary would be neglected, or perhaps purposely destroyed. A species might vary in this manner in two or more directions; and when after the lapse of a certain time, the two forms were compared with each other, and with the wild parent, it would very probably appear that there were three distinct species. Still more distinct would the two domesticated forms appear if the wild race had become extinct in the interval. Yet the domesticated forms would still at times display a tendency to revert to the original type, especially if accidentally placed in similar circumstances to those in which the wild species had previously existed. Two remarkable cases of reversion are quoted by Mr. Darwin; one is that of our domestic pigeons, which "are descended from a pigeon (including two or three sub-species or geographical races), of a bluish colour, with certain bars and other marks; and when any breed assumes by simple variation a bluish tint, these bars and other marks invariably appear, but without any other change of form or character. When the oldest and truest breeds of various colours are crossed, we see a strong tendency for the blue tint and bars and marks to reappear in the mongrels." Another case, still more remarkable, is that of the various species of horse, (including the ass, zebra, &c.,) all of which can be crossed, and whose hybrids are more or less fertile, although no one doubts that the species are as distinct as in any other mammalian genus. All these animals have a tendency to become striped, which is most conspicuous in the hybrids; and even the horse shows this at times, especially when of a dun colour, though the horse is more rarely striped than any other species. Of this Mr. Darwin says, in his graphic language, "For myself, I venture confidently to look back thousands on thousands of generations, and I see an animal striped like a zebra, but perhaps otherwise very differently constructed, the common parent of our domesticated horse; whether or not it be descended from one or more wild stocks, of the ass, the hemionus, quagga, and zebra."

In a wild state, species are exposed to fewer influences tending to produce variation; but in every large genus, it is notorious that the distinction drawn between species and varieties is often so slight as to be wholly arbitrary. Two allied species will occur in the same or an adjacent locality, while intermediate forms may occur either with the extremes, or in a different outlying district, the various forms keeping themselves more or less distinct. In the case of a group of large islands, the effect of isolation is often most remarkable. Take for example the case of the genus *Ornithoptera*, which contains some of the largest and most beautiful butterflies known. Its extreme limits are India and Australia, but the species are mostly found in the intermediate archipelago; and the various islands all possess their peculiar forms, often passing into one another by such slow gradations that it is anything but easy to say which forms are entitled to be classed as distinct species, and which should be considered mere varieties. How unlike is the magnificent green of *Ornithoptera Priamus* and its allies, to the rich blue of *O. Urvilliana*, or the brilliant golden orange of *O. Crœsus* and *O. Lydius!* The forms differ also greatly in size, shape, and markings; and yet they pass into one another by such fine gradations that all our best entomologists are now agreed that the twelve or fourteen described species in this group of the genus green, blue, and golden, are merely forms of one variable species. But supposing the intermediate forms were to become extinct, no one would ever dream of classing the others together. This instance may serve to show how indefinite is the idea of a species in the minds of even the most eminent naturalists who have not yet learned to regard the terms "species" and "variety" as synonymous.

It not unfrequently happens that two species will coexist throughout an extensive range, keeping themselves perfectly distinct at one extremity, while at the other they are so blended by intermediate varieties as to be scarcely distinguishable. Thus, two well-known Alpine butterflies, *Parnassius Apollo* and *P. Delius*, keep themselves perfectly distinct in Europe, even the larvæ differing; but in Asia so many intermediate varieties and local sub-species occur, that no satisfactory characters can be certainly relied on to separate them.

It has already been mentioned that the high geometrical ratio of increase of any species imperatively requires an almost equally high counterbalance of destruction to keep it within any reasonable bounds. Mr. Darwin has shown that every animal or plant is dependent for its very existence on an innumerable number of favourable circumstances, and the direct or indirect influence of a great number of other organisms; and that all are liable to immense destruction, generally in their young stages. So long as circumstances are sufficiently favourable to allow a species to arrive at maturity in sufficient numbers for reproduction, it will hold its ground; but a very slight balance on the other side will often exterminate it altogether. A power of adapting itself to circumstances by slight variations over its area of

distribution is, far more often than we are generally inclined to suppose, the chief protection of many a species.

In islands the various species have usually fewer competitors, and therefore become modified with reference to their competitors alone. Consequently, in islands we find most of the species differing from those of the mainland, more or less, according to the length of time the island has been isolated. (Isolation, acting as a bar to migration, may be mentioned as the chief reason why islands are usually poorer in species than continents.) If a continental species should be introduced into an island which has been isolated sufficiently long for its productions to have assumed an insular character, from the larger number of species with which it has had to contend, it will have a great advantage over the indigenous species, and will probably soon become common throughout the island, while the insular species which come into competition with it will run great danger of utter extermination. It also happens that when species are transplanted from one continent to another, they sometimes find their new circumstances so favourable that they are enabled to increase to a great extent, as the horse has done in America.

When a species once loses ground, it is rarely able to recover it; its enemies press it harder, it becomes rare, it is weakened by interbreeding, and interbreeding itself is unfavourable to variation; and from all these causes favourable circumstances or variations present themselves less and less often as the species becomes more reduced in numbers; and finally it sinks from the surface of the great ocean of life, and no trace, except, perhaps, a few chance fossils, remains to show that it has ever existed.

Sometimes a species will in the course of ages change its habits, in which case it may happen that organs of great former importance become useless to it under its new circumstances. Sometimes these organs are retained, as in the case of certain species of geese which are web-footed, but seldom or never swim; but in other cases, as in the wingless beetles of Madeira, and in the blind or semi-blind animals of great caves, disused organs become more or less atrophied, but never so much as to show no trace of their former existence.

It is commonly asserted that hybrids, when producible at all, are infertile, while mongrels are always fertile. But Mr. Darwin has shown that these statements are only partially true, and that though domestication often tends in the first instance to produce sterility in individuals of the same species, yet it afterwards facilitates the interbreeding of distinct species. To take an extreme instance, no difficulty is experienced in inducing any of our races of domestic cattle to interbreed, yet these are well known to have descended from at least three, if not more, distinct wild species.

It is often objected that geology furnishes us with no direct proofs of the progression of species; but this objection would only be valid if our palæontological collections could be assumed to be tolerably complete. But years in geology are as miles in astronomy; and who need wonder, when such immense numbers of living species are daily discovered, even in well-explored countries, that our collections should contain not the ten-thousandth part of the innumerable distinct species (to say nothing of all the intermediate varieties, as is sometimes so unfairly demanded) that have lived and died on the earth since it was a ball of incandescent lava? Again, millions of years are often represented in our cabinets by a very few chance remains of a very few species; and to claim that the geological record should be perfect in any sense would be absurd.

But it may be asked, How is it that, when large animals become extinct, their pigmy representatives often remain? Are the sloths of South America, which are no larger than monkeys, to be considered as the *improved* descendants of the gigantic megatherium, scarcely inferior to an elephant in size? The absurdity is obvious, and the difficulty is real, and yet it apparently admits of a very simple explanation. When a genus or family is dominant in any country, species of all sizes exist together, as we see with the kangaroos of Australia, which vary from the size of a rat to that of a large sheep, according to the species. But when a group or genus is becoming extinct, the hostile influences will act first and most forcibly on the larger species, which must always be fewer in number and less able to take advantage of accidentally favourable circumstances than the smaller ones. It is thus reasonable to conclude that when a group or genus has lost its ascendancy, the larger species will generally be the first to disappear, while some of the smaller may still continue to exist for many centuries after their former companions have become extinct.

The facts of geographical distribution may be considered to establish the axiom, almost universally admitted, that every species has been created or developed in one spot of the earth alone, from whence it has gradually spread itself over the district, large or small, which it now inhabits. We say *created* or *developed* to indicate the practical identity of the words as applied to Nature. The terms are often considered antithetical, but there is no real reason why they should be. No one can explain why distinct but closely allied species should be found on a continent and its islands, or in the Arctic regions and the mountains of temperate climates, on any other theory than that of common descent. Equally difficult, on any other grounds, is it to explain why species, in exactly similar conditions, should be confined to different sides of a continuous mountain-chain. It might, indeed, be

said that the species were created so; but, if this were the case, why should some Corsican species have been created like those of the mainland, while others differ more or less, so as to be reputed as well-marked local varieties, or even perfectly distinct species? If for the mere sake of variety, why should not *all* the species vary, and why should not every few miles of country have its distinct varieties or species instead of the most distinct forms of the whole Continent showing themselves on two small detached islands alone?

The occurrence of arctic species on the mountains of warmer climates is explained by Mr. Darwin to arise from the equatorial migration of all organisms at glacial periods (for it is the opinion of some eminent naturalists that there is a regular recurrence of glacial and tropical periods), when the arctic species were driven south and north to the plains of temperate climates, and the temperate species to the tropics. When the cold decreased, the arctic species would retreat towards the poles, and would ascend the mountains, where a few still remain. Some of the temperate species, at the same period, appear to have penetrated to the equator, with or without the aid of mountains; and on the return of the warmth were driven both north and south, which will account for the presence of so many identical temperate species both north and south of the equator.

One of the most singular phenomena which can be philosophically explained by Darwinism is that of mimicry,* *i.e.* the assumption by helpless animals of the colours or markings of those which are better protected, or else of inanimate objects. Thus the colour of desert animals is usually sandy. The common frog, which lives in muddy water, is mud-coloured, while the tree-frog is green. Arctic animals are almost invariably white. But, leaving these general resemblances, let us come to what is called mimicry proper, the assimilation of one animal to another totally unconnected with it. The most striking instances of this occur among insects. Insects will imitate flowers, leaves, snakes, and almost every conceivable object, but most frequently other insects which are better protected. A caterpillar, supposed to be that of one of the *Bombycidæ*, or silkworm moths, was once observed by Mr. Bates in South America, which presented such an extraordinary resemblance to a small venomous snake as to frighten all the natives to whom he showed it. The bee-hawkmoths, and the clear-wing hawkmoths generally, present so striking a resemblance to bees, wasps, hornets, and other stinging insects, as at times to deceive the entomologist. There is one large family of butterflies, the *Heliconidæ* (also including the old families, *Danaidæ* and *Acræidæ*) all whose members exude, when touched, a disagree able, ill-smelling fluid, which appears to render them obnoxious to birds and other insectivorous animals. One group is almost peculiar to Africa, another to the East Indies, and another to South America; and in all these countries we find butterflies belonging to several other groups, and even moths, which resemble them so completely that they are at times undistinguishable from them without close examination, and when on the wing must be perfectly so. All these mimicking species are much rarer than the insects they mimic, and are evidently mistaken by birds for uneatable insects. It therefore appears that as the insects of waning groups decreased in numbers, a slight variation, tending to assimilate them to those of a dominant group, would be beneficial to them, while the individuals which did not present it would be inevitably destroyed; and the ultimate effect of this would be that the variety would more and more assimilate itself by natural selection to the common species, till it became in time, perhaps, almost identical in appearance with it, and would thus be preserved when no other safeguard would avail it. The preservation of the female is of far more importance in many animals than that of the male, and so we often find the female protected by mimicry, dull colours, and similar means, while the male has no such protection.

We have now bestowed a passing glance on a few of the most remarkable of Mr. Darwin's theories and arguments, as laid down in his celebrated book "On the Origin of Species," and have also briefly noticed one or two of the more interesting subjects which have been discussed by his followers since its publication; but to go fully into a subject, each of whose branches would require at least an entire volume for its elucidation, is of course impossible here. But whether we go to the extreme length of the theory, and believe with Mr. Darwin that all the forms of organic life have originated from half a dozen primordial germs at most—and probably from one only—or whether we are simply led from an examination of his arguments to the conclusion that species are more variable than is commonly supposed, it is scarcely to be disputed that the whole subject is worthy of far more serious attention from the general public than it has hitherto received; and if these few pages shall have the effect of calling the attention of one unprejudiced thinker to the subject, our object will have been attained.

Dublin. W. F. Kirby.

* Compare the able article on "Mimicry and other Protective Resemblances among Animals," in the *Westminster Review* for July, 1867.

Fleas.—During the drought we rarely ever saw such a thing as a flea; but the rain had scarcely visited us before we were infested, so much so as to become a task to rid ourselves of them.—*G. Bullard.*

THE PUPA OF A DRAGON-FLY.

On the 5th of December, 1867, I procured from a London shop the pupa of a Dragon-fly, which was either *Æshna varia* or *Æshna grandis*, and seeing it stated in the October number of Science-Gossip that "little is known of the habits of larvæ and pupæ of the Dragon-fly, and any one who could describe them would do good service to science," I determined to watch this pupa carefully, and placing it for that purpose in a large-mouthed water-bottle, I thrust a long piece of lath into the bottle, for the pupa to hold on by. To this lath the creature would cling for hours, quite motionless, with its head downwards, and with the horny appendages at the end of its abdomen just touching the surface of the water.

If I approached too closely when it was at the near side of the lath, it would nimbly slip round to the far side, in order to escape observation, but apparently without being much alarmed. At other times its movements were rather slow and deliberate. It would rarely leave its resting-place, unless attracted away by the movement of some small creature suitable for its food. But when the water was changed and the bottle cleaned, and pupa and lath were both taken out together,—on being put back, it would swim about, allowing its legs to hang loosely by its side, and propelling itself along by squirting water out of its abdomen; but it soon tired of the exertion, and returned to the lath.

The apparatus with which it is provided for seizing its prey is so remarkable, that although it has been described before, I cannot refrain from touching briefly upon it here.

Speaking very roughly, this apparatus may be said to consist of a kind of flattened arm, which, when not in use, is tightly folded up (like a carpenter's rule) under the creature's body; it consists of two joints, and instead of being fixed to the shoulder, as in man, it is attached to the under part of the pupa's head, to the part—if the comparison is admissible—which in us, is between the throat and the chin. The first joint of this arm (or prehensile apparatus, as it is called) folds back under the thorax; the second joint folds forwards, and is just sufficiently long to reach to the mouth. Its extremity is furnished with two hooks or claws, which open out laterally, somewhat as the little finger and thumb would do when our hand is held palm uppermost and widely spread out. These two claws are long enough to cross each other, and by so doing they partially cover and conceal the mouth of the pupa when the creature is at rest; and hence the apparatus has received the name of a "mask."

The length of this mask bears about the same proportion to the length of the pupa, that the human arm bears to our height. It appears to have little or no lateral play, but can only open out and act straight in front of the head of the pupa.

When the creature spies anything worth eating, which is moving about in the water or on its surface, it creeps up to the object, until it is within striking distance, and then suddenly darting out its mask, and opening the claws at the end, it seizes the prey: the mask is then drawn back, so as to present, in the most convenient manner, the food to the mouth of the pupa, until the prey is entirely devoured.

The Dragon-fly has been loosely accused of extraordinary pugnacity in all stages of its existence; but as far as the larva and pupa are concerned, I could see no symptoms of such a propensity. On the contrary, the creature in both those stages was rather timid, and would get out of the way of such things as the water-scorpion; and taking into consideration the fact of its turning round so slowly, and of its having scarcely any means of defending itself against a nimble foe at close quarters, it is by no means suited to promiscuous fighting; and I believe never seizes anything, except in obedience to the dictates of hunger.

I had great difficulty in procuring food for the pupa in the middle of the winter, and owing to this, the only thing it had to eat from the 6th of December till the 13th of the following February—a period of seventy days—was a common house-fly.

After the 13th of February, and at intervals varying from three to ten days, according to what could be obtained for it, it ate ladybirds, blue-bottle flies, water-boatmen (of which it was especially fond), a tadpole or two, and several small red worms.

It refused water-beetles of all sorts, and with one exception—if it can be called an exception—it never took any notice of things which were dead or did not move. One day, however, I observed that (in a glass globe standing in my room) a water-boatman (Notonecta) had fastened upon a small eel about 3½ inches long, had killed it, and had begun to eat it. I placed them both, without disturbing the Notonecta, into the pupa's bottle. The pupa seeing the water-boatman move, took a shot at it, but striking the eel instead, quietly devoured the whole of the latter up.

On another occasion I saw a water-scorpion (*Nepa cinerea*) take away from the pupa, a Notonecta which the pupa had begun to eat; but this was only two days after the feat of despatching the eel, which was nearly twice its (the pupa's) length.

I have said that the pupa generally avoided the water-scorpion. Once, however, when the former had had nothing to eat (except a ladybird) for some twenty days, it seized a *Nepa cinerea* by the abdomen. The Nepa at the same time attacked the pupa with its sharp fore-legs, evidently much to the discomfort of the former; and the only way in which the pupa appeared to be able to get rid of the

annoyance, was by curving its body completely round, and by main force shoving the Nepa's fore-legs off, with the end of its abdomen. This occurred several times; but gradually the Nepa became exhausted, and at last was entirely eaten. Immediately after this meal the pupa devoured a blue-bottle fly.

This brings us to the beginning of May, and about the 10th of that month the pupa began to refuse all kinds of food; and knowing that its final change was near, I took the precaution of wrapping some muslin round the end of the lath which was out of water, for the pupa to fix its feet firmly into whenever the change might occur.

On the morning of the 26th, at 10 a.m., it crawled, for the first time, out of the water, but shortly immersed itself wholly in again: at mid-day it thrust its head and thorax out, and so remained till 6.30 p.m.; then, leaving the water entirely, and climbing up to the under side of the muslin at the top of the lath, it remained stationary. It began now to lash its abdomen, with rather violent jerks, from side to side; and whilst I was eagerly watching it, I observed, exactly at 7.30 p.m., a bright green spot in the middle of the upper part of the thorax. This was the body of the Dragon-fly seen through an opening in the skin. This opening (which, as far as my experience goes, never extends beyond the thorax) rapidly increased in size, and soon the head and thorax of the Dragon-fly were clear of the old integument: the legs were then smoothly drawn out, and when the creature was sufficiently out of the old skin to allow of its being done, the head fell gently back, and at last hung completely down. More and more of the abdomen was all this time being gradually withdrawn, until at last I, and those who were looking on with me, were greatly alarmed lest the creature should fall down backwards, and be seriously injured in its then soft condition, and the climax of our observations be brought to an untimely end. Instinct, however, had taught it exactly when to stop, and at the end of five minutes from the time the opening took place in the skin, the Dragon-fly had performed the first act of the operation of changing; that is, it had pulled itself out of the old integument as far as it then intended to go, only leaving just enough of its abdomen still in, to hang on by.

In this strange position it remained, perfectly motionless, for fifty minutes; then quickly turning up its head and clutching the old integument with its legs, it entirely freed the remaining part of the abdomen, leaving the old skin in a very perfect condition, always excepting the hole in the thorax.

Up to this moment there was no perceptible change in the size of the wings: they looked almost as if they were still in their small wing-cases: but now began the most wonderful and critical part of the whole operation.

The Dragon-fly was clinging (head uppermost) to the old skin, this old skin being firmly fixed to the under side of the stick (the upper side would not have answered the purpose); and curving itself in such a way that the wings, in their development, should hang down without coming in contact, either with its body or with anything else, the creature appeared to devote the whole of its energies and being to the most important object of producing for itself a fully-developed uninjured set of wings.

Gradually and beautifully did these delicate membranes expand, and grow downwards. This operation took just twenty minutes, and when ended the wings were about eighteen or twenty times their original size; but quite soft, and hanging close to each other.

I did not think it necessary to watch the creature any more just then; but the next morning, on opening the shutters of the room, a very handsome, perfect Dragon-fly stood upon the table, with a bright green head and thorax; abdomen striped black and green; black legs, and with its shining gauze-like wings wide apart and quivering ready for flight. It measured three inches in length (exclusive of its abdominal appendages) and four and a quarter inches across the wings.

I took it out into a sunny part of the garden, and in three minutes it soared up to the top of our highest tree, and was lost to us for ever.

This Dragon-fly had been kept in a warmish room all the winter, and perhaps changed somewhat earlier than it would have done in a natural state. Two other pupæ, which I procured after this one, changed respectively on the 28th and 29th of May: the opening in the skin of the former took place at 9.30 p.m., and of the latter at 10 p.m., and they took about the same time as the first one described, to accomplish the various parts of their final change.

It is somewhat remarkable that in all these cases the changes took place either in the dark or at dusk; for there can be no doubt that, from the time of the bursting of the skin till the Dragon-fly is able to take flight, the creature is in a most helpless condition, and would fall an easy victim to anything attacking it.

I ought to mention that the pupa (without the horny appendages at the end of its abdomen) measured just two inches. It did not increase in size, nor did it change its skin, except finally, whilst I had it.

This then gives the entire history of the creature for 5½ months of its existence.

It was curious that none of the pupæ I procured ever died; and on the other hand, out of several larvæ, I never could succeed in keeping one alive; but I had time to observe that the latter do not appear to have the same use of their legs that the pupæ have, for they never clung to a stick, but

always remained at the bottom of the water. They, like the pupæ, move about principally by squirting water out of the abdomen, and this faculty enables them to conceal themselves quickly, after each change of position they make; for the flow of water from the abdomen causes a gentle stream to pass over them, which, carrying with it particles of mud, soon covers them sufficiently to make it difficult to distinguish them from surrounding objects.

The observing of this pupa all through the winter gave me and my family a great deal of amusement; and if any of the readers of Science-Gossip should wish to follow the example, and should be fortunate enough to witness the final change of the pupa into the Dragon-fly, I think they will be inclined to admit with me, that few sights in nature are more wonderful and beautiful: the only piece of advice I should give them would be, to keep the pupa in a place by himself, as he will certainly look upon almost all things put in with him as part of his larder, and treat them accordingly.

Frederick Pollock.

Thurlow, Clapham.

A FRESH-WATER ACTINIA.

By the courtesy of Dr. Stolicza, of Bengal, I have been favoured with some particulars, possessing remarkable scientific interest, of the habits and anatomy of what must be called a *Sea*-anemone, though it inhabits waters which are much more fresh than salt.

At a meeting of the Asiatic Society of Bengal (see Proceedings for July, 1868) Dr. Stolicza communicated the results of his examination of the anatomy of *Sagartia Schilleriana;* a species of Actinia, which he had found in the brackish waters of the Sunderbunds, that low-lying district of India that is formed by the numerous mouths of the Ganges up which the tides flow. The species lives attached to the trunks of old trees, in water which, by analysis, contains *not more than one-third* of the saline constituents of pure sea-water, in 1,000 parts of which they vary from 32 to 37 parts. In general, however, all the principal constituents, — the chlorides, iodides, &c., are present; the difference affecting only the quantity, not the quality.

The species is one of extreme softness and transparency; of a dull whitish hue, the column marked with longitudinal, alternating greenish bands; the septa are usually 48 in number; the ovaria are bluish-purple; the craspeda yellowish or greyish white, and the acontia pure white. The walls of the body consist of five different layers; the outmost is a mucus, chiefly composed of large *cnidæ* or nettling-cells, and a few pale-green pigment-cells. Then follows a thin muscular layer, principally composed of concentric or cross fibres; next, a rather thick layer of green pigment; then, again, a thick muscular layer, gradually passing into a tough muscular tissue, in which *scleroids* [or hard bodies] of two kinds are imbedded. The one kind are long cylindrical rods, with short lateral branches, and consist of carbonate of lime; the other kind are thin flat rectangular plates of various forms, consisting of silica.

The nature of these scleroids, after their difference of form had been observed by simple maceration of the tissue, was positively ascertained by burning a specimen of the animal in a platina crucible, until all organic matter had disappeared. The result was a perfect skeleton, represented by an irregular network of solid white fibres. These were resolved, by the usual chemical tests, into two portions, as just stated; the carbonate of lime, which formed the larger portion, being dissolved away, left a very thin membrane composed of the siliceous plates.

The tentacles are arranged around or near the margin of the disk, in apparently alternating circles, and number about 150. The *acontia, craspeda,* and *ovaria* are all attached to the internal side of the strongly muscular larynx [or what I should term the *outer* side; for I presume that the surface of the stomach-wall which is next to the circumference of the animal is meant]. The *acontia* are very long, pure-white bands, solely consisting of long *cnidæ;* these latter being transparent cells, with more or less prolonged, retractile [?] and bearded stylets, called *ecthoræa.* These *acontia* are projected through the holes (*cinclides*) of the integument, whenever the animal is irritated, and serve as defensive organs. The *craspeda* are similar bands of a yellowish colour, but shorter, and never projected. These appear to be connected with the digestive system: their composition is similar to that of the *acontia,* except that there is in the centre a considerable accumulation of an intercellular substance. The *ovaria* are long strings, lying between the mesenterial folds: there are twelve pairs of them, composed of eggs only. Thread-like organs, chiefly composed of spermatozoa, appear to be only occasionally formed.

In this description the point of greatest novelty is the presence of earthy scleroids of defined forms in the column-wall. That such are found deposited within the integuments of certain *Echinodermata* is well known; but this is the first time, so far as I am aware, that they have been discovered in the non-coralligenous *Actinozoa.* It is not impossible that their presence may reward closer search in some of our native species.

Torquay. P. H. Gosse.

Nothing useless is, or low;
 Each thing in its place is best;
And what seems but idle show,
 Strengthens and supports the rest.

Fig. 226.

"ACKERSPRIT."

THE drawing at the head of this chapter represents a peculiar condition of the potato, which is unfortunately very prevalent this year, and which has, no doubt, been caused by the influence of the weather. The long-continued drought caused all kinds of crops to come to maturity very early, and many of the potatoes, although not properly ripe, had ceased growing before any rain came. Then at the end of August we had plentiful and refreshing showers, which changed the brown fields to spring-like green in a marvellously short time. We had, in fact, a second spring. Spring flowers began to bloom again, though it was autumn; plants that had really come to their full growth received an impetus, and began to sprout again; and the potato tubers in the ground sent out buds, and sometimes long shoots from the "eyes," as if newly planted, and in many cases these buds formed a second crop of new potatoes, as represented in the drawing. Such a state of things is very detrimental to the crop, for the new potatoes grow, or, at any rate, commence their growth, at the expense of the old ones, which will be soft and spongy, like potatoes that have been kept too long into the summer.

The *Gardener's Chronicle*, in a leader of September 19th, explains the process of "supertuberation," by supposing that the sprouting was caused by the excessive heat acting on *unripe* potatoes, not ripe ones; and that the process would not occur to any extent in ripe potatoes. That moisture was undoubtedly necessary, but that it came, not from the rain, because the process was noted before any rain fell; but that the moisture must have come from the parent tuber, which in its unripe condition contains considerably more water than when ripe. This may be the correct explanation, but I am inclined to think that the greater part of the moisture was supplied from external sources; for here, at any rate, the greatest amount of supertuberation was observed after the rain fell; and before the chief rainfall we had had, now and then, a wet day. The rain has undoubtedly been the cause of a similar phenomenon taking place in other plants, where *ripe*, and apparently dying stems have shot out again into leaves and flowers. But if the potatoes supplied their own moisture, as they, no doubt, did to some extent, they grew, not because they were *unripe*, but because they had previously come to a complete standstill in their growth, and were in the same condition *as if they were* ripe, and had been replanted; for when plants that are ripe enough to be taken up are not taken up,—for example, onions, they invariably commence a second growth if the weather is mild enough; and if the potatoes had sprouted in some degree before the rain, they did so with tenfold vigour afterwards, and the haulms, in many cases, became quite green again.

This condition of the potato is known throughout Cheshire, Staffordshire, and probably most of the neighbouring counties, by the name *ackersprit*. The word has no connection with the scientific term *acrospire*, which is derived from Greek words, and is explained in botanical dictionaries as meaning "the first leaves that appear when corn sprouts." The two words do not describe the same thing, and it is extremely unlikely that farm labourers, spread over a large part of the country, should have so generally adopted a modern scientific term. The similarity of sound is curious, but is accidental. I have no doubt *our* word is derived from, or more properly *is*, Anglo-Saxon, and has been in common use ever since the Saxon times. *Sprit* means *sprouted*, from A.S. *spreotan*, to *sprout;* and *acker* is from A.S. *æcer*, a field. (Our word *acre*, which now means a particular quantity of land, meant originally simply *a field*, as in the old name for a grave-yard—*God's Acre*, which did not imply that it was an acre in extent, but simply that it was a sacred enclosure.) It is customary for potatoes to sprout in the spring *after* being stored up; and the meaning of "acker-

sprit," as applied to them, is that they are *field-sprit*, that is, sprouted even whilst growing in the field.

There is another very peculiar abnormal development often seen in the potato plant, which is also known in Cheshire as "ackersprit." The buds in the axils of the leaves, especially if the haulm be spreading on the ground, swell out and form small green or purple tubers, instead of extending into a branch. These small tubers exactly resemble underground

Fig. 227.

potatoes, except as regards colour, and in the fact that they often send out bunches of leaves from the eyes. The accompanying drawing represents this strange development. It is interesting, because it shows exactly how potatoes are formed, and what they are physiologically,—namely, enlarged buds of *underground* shoots.

There are some plants which are extremely interesting, as their *usual habit* is to be "ackersprit," and to produce these axillary buds, not as an abnormal development, but as one of the ordinary means of propagation. The rare *Cardamine bulbifera* is an instance, and in gardens the tall and showy *Lilium bulbiferum*. In both these plants great numbers of bulbilli are formed in the axils of the leaves, which drop off when sufficiently ripe, and take root in the soil, bearing a strange analogy to seeds, but formed without the aid of impregnation. Viviparous plants, though not called "ackersprit," present, physiologically, very much the same phenomena. The Black Maiden's-hair Fern, *Asplenium Adiantum-nigrum*, is very apt, when grown under a glass, to produce young plants upon the edges of the leaves: these drop off and take root like the little bulbs of *Cardamine*. The common Lady's-smock, *Cardamine pratensis*, has a very strange propensity. Its terminal leaflets frequently fall off and take root, throwing out a radicle and plumule from their base just as a seed does. In mountainous districts a vary pretty grass, *Festuca vivipara*, is found growing in the spray of almost every waterfall, and dipping its spikes of green leaves into every mountain stream. Each floret of this grass, instead of producing seed, shoots out into a bunch of leaves, forming a spike of young plants, which fall off eventually and take root. The same fact is often observed in some of our common lowland grasses, especially during a rainy autumn. *Cynosurus cristatus* is very prone to become viviparous, and occasionally *Dactylis glomerata*.

The same phenomenon of ackerspritting, though in a different form, has extended itself to a great number of our garden plants, and some very interesting facts have been observed. Almost all plants, both perennial and annual, bloomed and ripened their seed a month at least before their usual time; so that at the beginning of August gardens that had not been continuously watered looked very deplorable indeed, and were little better than an untidy wilderness of dry sticks. But the rain caused some very remarkable changes. The dry stems seemed to receive new life, and, sprouting at the joints, became quite green again. Some plants often do so in a slight degree, such as Sweet William, Evening Primrose, and others; but this year both have sprouted so freely, producing bunches and spikes of flowers at every joint, that when the seeds are cut off from the top the plants are as bright and gay as if it were summer-time. *Erysimum Peroffskianum* has done the same, and is now again in full flower. *Crimson Flax* which had ripened its seed has sprouted out from the *base* of the plant in so remarkable a manner that the beds are completely renewed. A large bed of *Borage*, grown for the sake of the bees, was quite out of flower and was apparently dying away; but in a fortnight after the rain came, the plants were quite green again. We took the trouble to cut away all the dead tops, and now the bed is in full flower a second time, to the manifest delight of the bees. The most curious examples of this kind that I have seen are the *Snapdragons*. These plants always shoot out below

the ripe seed and continue flowering; but this yea the dry spikes of seed have grown again *at the point*, and are now crowned with beautiful long spikes of flowers. These effects have not been confined to gardens and garden flowers, for many of the wild plants have sprouted in the same way—the irrepressible docks and thistles especially. *Linum catharticum*, too, has sprouted at the roots exactly in the same way as the Crimson Flax in the gardens.

A good deal of alarm has been expressed with regard to the ackerspritting of the potatoes, and there is no question but that potatoes that *are* so affected are irrecoverably spoiled. The parent tubers are soft and of little value, whilst there cannot be time in any case for the second crop to come to maturity. But even these damaged potatoes are excellent cattle-food, and with respect to the main crop, I think we need have no apprehension whatever, for all varieties are not ackersprit, nor are the majority of the plants affected, whilst the dry summer has had such a beneficial effect on the plant generally, that there is no potato disease to be found throughout the whole of the land, and as far as my own experience goes, the potatoes that are *not* ackersprit are so fine and so abundant that we still have a crop decidedly above the average both as regards quantity and quality.

October 6th, 1868. ROBERT HOLLAND.

VULGAR NAMES.

HAVING plucked a little blue flower in a garden in Wiltshire, I was incautious enough to ask the proprietor, an owner of many "water-meadows," to tell me the name of "this pretty and fragrant leguminous plant."

With a smile of compassion at the ignorance of his London guest, my friend informed me that it was "only a bit of old sow."

I thanked him: I felt decidedly humiliated—and not much wiser than before. Why should this plant be called "old sow"? and what knowledge of its nature and properties is communicated by such a name? and, above all, why should this agrarian philosopher look upon me with contempt because I am ignorant of what most probably constitutes his whole knowledge of it—its vulgar name?

This unpleasant incident caused me to inquire a little into the subject of vulgar *versus* scientific names.

The methodical names which are scientifically given to natural objects, and which generally express, to those who understand them, some indication of the quality and position in nature of the things in question, have been treated with outspoken contempt by several of our most admired novel-writers. One, in particular, has been very severe on this subject; and although it may appear an ungrateful task to repay the delight afforded by his charming and original novels by finding out something to be condemned, where all else is so much to be admired, yet it should not be forgotten that the influence of so fascinating a writer must be widely extended, and that the "worship of truth" is even more sacred than the "worship of genius."

In one of Mr. Charles Reade's tales we find the following exclamation:—"Would I could show this sight to all the pedants of science who spend their useless lives in studying the limbs of the Crustacconidunculæ!" and a few pages further on, "A fact no mortal man will believe whose habit it is to chatter blindfold about man, and investigate the Crustacconidunculæ."

In another novel the writer says that "snobs in fustian jackets, without a single polysyllable to their tongues, find all the gold and all the coal that is found; and science finds the Crustacconidunculæ;" and he also tells us that it is "amusing to be able to classify plants, not by their properties, but by their petals; and to call everything by its long name, that belongs to twenty other things as well; instead of knowing each by its own name, as the vulgar unscientific do."

Mr. Charles Reade appears, in fact, never to be ired of heaping contempt upon natural science and scientific names.

The thesis sought to be established by writers who indulge in this style of criticism is that scientific men are merely pedantic wiseacres, and that the real naturalists are gamekeepers, gardeners, and fishermen; the true geologists, stonemasons and working miners. They would assume that only those "practical men" whose lives are passed among natural objects can tell us anything worth knowing about them.

That this is altogether a mistaken idea can easily be proved by examining some of these experienced persons on the most simple and elementary facts of nature, and it will also become evident with how much caution we should receive even their most positive assertions.

In illustration of this I will mention a few cases among many which have occurred in my own personal experience.

I once asked an old gardener who had been collecting crops of snails all his life, "what they were." "Why snails, to be sure." "Ah," said I, "but *what are snails?*" "Well, sir," said the man, after some reflection, "they are not animals, nor yet insects; they are fish, like whelks; they are shell-fish sure enough."

On another occasion I had been listening to several tales about sharks, told very graphically by a captain in the merchant service, who had taken and cut up many of these creatures. These tales referred chiefly to the large collection of valuable property usually found in their insides, such as musical instruments, firearms, and "general fur-

nishing ironmongery." I had never seen alive anything nearer to a shark than a little spotted dog-fish, and, remembering something I had read in Rymer Jones's book, I asked for some information about the intestines of these voracious monsters.

"Intestines," said the skipper, "they have none; at least, none to speak of; only a few strings."

Another example I can give of this kind of popular science is yet more astonishing, as it was afforded me by a well-educated and clever man, a great traveller, and a thorough sportsman, who had shot the bison and tracked the moose in America, and who had lately been, I believe, in Africa, on lion-hunting deeds intent. This gentleman, after a course of gold-digging at the Fraser River, had spent a season on the coast, collecting the trepang (*Holothuridæ*) for the Chinese market. To him I put the fatal question, "What is the trepang? Is it an animal or a vegetable?" "Well," he answered, "you cannot rightly call it either; it is a fungus." "What do you mean by a fungus?" said I. "A fungus," was the reply, "is anything fleshy and slimy-like."

Professor Forbes, in his charming little work on the British starfishes, gives an amusing account of the state of natural science among the fishermen of the Shetland Islands. Speaking of the great sea-cucumber (*Cucumaria frondosa*), he says it is "arranged by them in an extensive though most unphilosophically constituted class of marine animals, to which they apply the term 'Pushen,' which being translated signifies poison. In this Thulean arrangement numbers of the rarest of British animals are unfortunately included. I say unfortunately, for all members of the class *Pushen* are unceremoniously and speedily thrust overboard, almost as soon as seen in the fishing-boats, being considered unlucky and dangerous in their nature. The class is not an ultimate division. The Shetland fishermen arrange all marine animals not used as food under the general head of 'Combustibles,' certainly a most extraordinary application of that excellent English word. 'Combustibles' they divide into Harmless Combustibles and Pushen, under which last division I fear all the animals which it has been my fortune to describe in this volume must take their places."

Here, then, we become acquainted with the kind of knowledge recommended to us by the writers who insist on individual and practical experience as the only ground of truth. We must throw up all pedantic science, and learn of those who really know something about the matter. Above all, we must discard all the "crack-jaw" names invented by the scientific to hide their "learned ignorance," and "call a spade a spade." We must not mention the "*Crustaceoniduneulæ*" (whatever that may mean), but turn back to common sense and common English.

An examination of the common or vulgar terms applied to plants and animals will at once introduce us to a complete language of meaningless nonsense, almost impossible to retain, and certainly worse than useless when remembered,—a vast vocabulary of names, many of which signify that which is false, and most of which mean nothing at all.

The false or erroneous names comprise such terms as the sea-mouse, the Tasmanian wolf, the civet cat, and the fern owl, or, in other words, a mouse belonging to the annelida, a marsupial wolf, a cat allied to the weasels, and an owl among the *Caprimulgidæ*.

These false names, although very numerous, are, however, altogether transcended in number by the astonishing mass of those which are quite without meaning of any kind. However, "we must learn," and, to commence, we should at least be acquainted with the names of some of our common English birds.

A few specimens of these, taken at random, will suffice to shame us into knowing what birds are described by the names of flushers, pianets, stone-galls, swinepipes, and gowks. Surely when we see a high-hoe, a shell-apple, an alp, or a yellow yowley, we should be aware of that interesting fact. A skelly, shilfa, or scoby, a goldspink, an aberdevine, and a coldfinch should not be unknown to us; and after learning to distinguish a puttok from a ruddock, and these two from a dunnock, we should make ourselves familiar with the personal appearance of a deviling, an ox-eye, a gorcock, and a muggy.

Having commenced our ornithological studies by mastering this first lesson, and shown thereby our respect for Mr. Charles Reade's opinion on natural science, perhaps he will, as the admirer and exponent of what may be called the "smock-frock" or "leather-legging" school of natural philosophy, kindly inform us what sort of feeling it is to be "puckeridge struck by a night-jar."

Kensington. H. C. Richter.

THE KITE.

(*Milvus regalis.*)

THIS bird is very rarely met with now in England, owing partly to the destruction dealt out to all birds of prey, and partly to the felling of timber in different parts of the country, which has deprived the Kites of their favourite localities for breeding. In the Zoological Gardens at the present time is a specimen presented by Howard Saunders, Esq., which was, I believe, taken in England; but we very seldom hear of a capture of a bird of this species now. The Kite used to be common in this country, and was useful as a scavenger, this being, apparently, a distinguishing characteristic of this

group of Hawks. Of the allied species, *Milvus ægypticus*, we read in the Rev. H. B. Tristram's "Great Sahara":—"Sociable, fearless, and inquisitive, it readily approaches man, and hangs over the Arab camp, waiting for offal, and counting the poultry stock. Its nest, the marine-storeshop of the desert, is decorated with whatever scrap of burnouses and coloured rags can be collected; and to these are added on every surrounding branch the cast-off coats of serpents, large scraps of thin bark, and perhaps a bustard's wing."

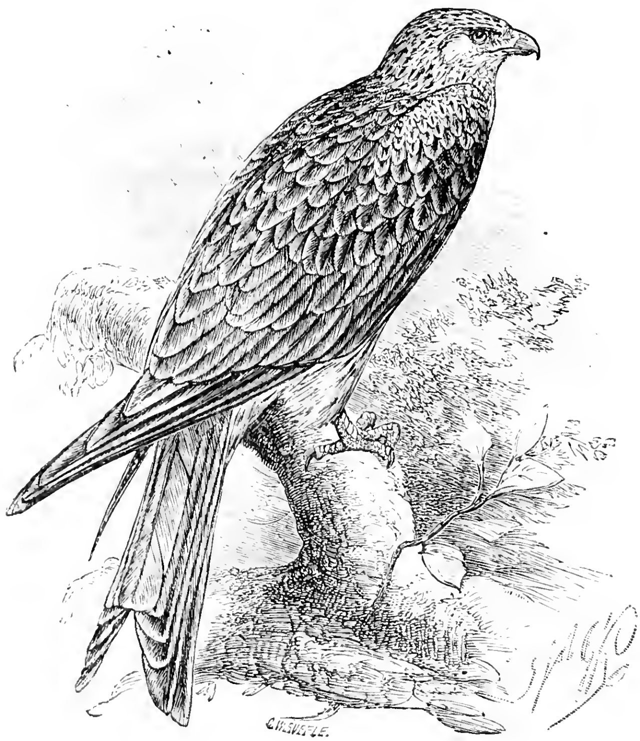


Fig. 228. The Kite (*Milvus regalis*).

Macgillivray, in his "History of British Birds," gives the following interesting note as supplied to him by Mr. Weir:—"In the neighbourhood of Bathgate the Fork-tailed Kite very seldom appears,* as during the long period of twelve years I have seen one male only. For three successive seasons he frequented this parish, and was in the almost daily habit of visiting the same localities, making his appearance at his different haunts about the same hour each day. Amongst partridges and other birds he committed great havoc. His flight was easy and graceful, consisting of curves and extensive circles, which were performed by the almost imperceptible motion of his wings, and guided by his forked and elongated tail. He occasionally soared to a great height. When with outstretched wings he performed some of his majestic aërial evolutions, he has again and again delighted and astonished the inhabitants, who believed that he was one of Jove's noble birds that had come from the cold regions of the North to visit this our more genial clime. . . . ."

Mr. Stevenson cannot give us many instances of the Kite's occurrence in Norfolk, the last one, probably, obtained in that county being a female, trapped at Croxton, near Thetford, in November, 1852. At Cookham, in Berkshire, I have met with people who can remember when the Kite was common on Maidenhead Thicket, an unenclosed heath of considerable extent; but no instance of its occurrence in the neighbourhood has been recorded of late years.

In South Russia it is, according to Demidoff,* "very abundant everywhere, especially in Bessarabia. I cannot say," he adds, "with certainty, whether it migrates from our country in the autumn, but I know it has been killed in the month of March near Odessa. With us it does not feed on fish, and

* The Kite is known in many localities by this name, and must not be confounded with the *Swallow-tailed* Kite (*Nauclerus furcatus*).

* Voy. dans la Russ. Mérid., vol. iii. p. 106.

prefers the steppes by the side of the rivers and sea-coasts." The Rev. H. B. Tristram says* that in Palestine "the Red Kite is universally distributed in winter, but retires in early spring from the southern deserts to the ravines of Lebanon and Gilead to breed."

From Mr. Osbert Salvin's interesting paper in the *Ibis*, on "Five Months' Bird-nesting in the Eastern Atlas," I make the following extract concerning the present species:—"For the most part we found the nests of the Kite were much dispersed; I have no instance noted of more than a pair occupying one cliff. When in a rock, they were usually placed where a small tree or shrub grew out of a crack. Such was the case at Djebel Dekma, Khifan M'sakta, and Kef Laks, with a single exception. In this case the nest was in a hole in the precipice that forms the western termination of Djebel Dekma. The young in this nest were hatched in the first week in April. About the Ouled Zeid country, north of Souk Harras, the nests were usually in trees. Nearly all the eggs we obtained were remarkably devoid of colouring."

With the exception of the few extraneous localities already mentioned, the geographical range of *Milvus regalis* would appear to be confined to the European continent. It seems to be a purely Palæarctic species. R. B. Sharpe.

* P. Z. S., 1864, p. 428.

MICROSCOPIC SEEDS.

VERY little attention has been bestowed upon the minute seeds of plants as microscopic objects; indeed, many microscopists are fain to treat them with contempt, and mounted slides of microscopic seeds are usually amongst the unsaleable articles of an optician's cabinet. Why this should be the case we are at a loss to determine. It cannot be on account of the rarity of the objects, because they are in reality some of the most common. It cannot be occasioned by the difficulty of mounting them, because the tyro is able to accomplish this with the smallest amount of experience. It cannot be urged that they all follow one monotonous type, because they exhibit considerable variety. And yet the fact is patent that, of all microscopical objects, minute seeds excite the smallest amount of interest. On this account we have resolved upon this effort to become champion of a neglected cause, to plead for the despised; and we do so under the conviction that ignorance must, after all, be the basis of so much lack of interest in a class of objects so variable and so beautiful.

Instead of grouping seeds according to their microscopical characters and general appearance, we have determined upon following the less popular, but more instructive method, of classing them under their natural orders—that is, adopting a botanical classification; and yet, whilst following such a course, the coincidence of type will often be manifest, sometimes in the species of a genus, sometimes in the genera composing a family.

Our observations must on this occasion be confined to a single order, which contains many noteworthy examples. The seeds employed are either British, or in common cultivation: the latter may be obtained from a seedsman.

The large Foxglove family, called by botanists *Scrophulariaceæ*, contains at least two thousand species of plants, which are distributed all over the world. Many of them have small, and some of them exceedingly beautiful seeds. We will commence with the—

Purple Foxglove (*Digitalis purpurea*).—The form of the seed is cylindrical, with blunt ends, and is traversed on one side by a shallow longitudinal groove. The surface of the seed is minutely honeycombed with rather irregular hexagonal pits. The elevations are of an ochraceous tint, and the body of the seed, as seen in the depressions, of a nut-brown (fig. 229, × 40).

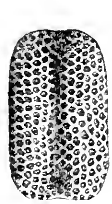


Fig. 229.

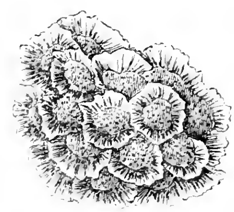


Fig. 230.

Yellow Foxglove (*Digitalis lutea*). — Form much more irregular, the pits shallower, and the elevated hexagonal markings less decided than in the Purple Foxglove. The colour uniformly nut-brown.

Common Snapdragon (*Antirrhinum majus*).—Form somewhat irregularly oblong. Surface with deep, irregular, often elongated, large, hexagonal pits, the ridges forming the pits being as high as the diameter of the pits themselves, irregular at the margin, and striated. The bottom of the pits minutely reticulated. The colour a dull snuffy brown (fig. 230, × 40).

Small Snapdragon (*Antirrhinum orontium*).—Most distinct in its difference from the foregoing. The seeds are nearly of the same size, in one view elliptical, resembling a saltcellar, with a flat spreading border all around the base, nearly upright sides, with the upper margin lobed, and a long elevated ridge at the bottom of the deeply depressed centre, covered with minute granulations, some seeds nearly white, or cream-coloured, others dark-brown. Most peculiar seeds (fig. 231, × 40).

Small Toad-flax (*Linaria minor*).—Egg-shaped, with a few prominent longitudinal ridges, occasion-

ally united by short transverse ribs, chiefly at the end of the seed: ribs faintly transversely striated. Colour a bright sherry-brown (fig. 232, × 40).

BIRD'S-FOOT TOAD-FLAX (*Linaria triornithophora*).—Nearly circular and discoid, convex on one side, and plane, or slightly concave on the other. Surface granular. Dull umber.

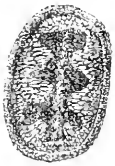


Fig. 231.

Fig. 232.

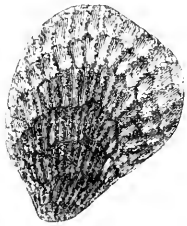


Fig. 233.

THREE-LEAVED TOAD-FLAX (*Linaria triphylla*).—Seeds elongated, angular, and variable. The surface granular, with numerous irregular depressions. The ridges slope gradually on each side to the bottom of the pits, so as to have the appearance of undulations, and not of distinct ridges, as in most of the preceding. Colour blackish-brown.

YELLOW MIMULUS (*Mimulus luteus*).—Kidney- or shell-shaped, with furrows radiating from the hilum to the convex ridge, and with similar transverse depressions, leaving small irregular elongated elevations covering the surface of the seed. The elevations are in a regular series. Resembling the seeds of some of the Pink and Sweet William family (*Caryophyllaceæ*), varying from a rust-colour to a blackish-brown (fig. 233, × 40).

HOOKER'S SCHIZANTHUS (*Schizanthus retusus*).—Seeds kidney-shaped, the surface deeply honey-combed into hexagonal pits, which are concentric, and parallel with the convex side of the seed. The
crimped," or
acutely zigzag. Colour, pale umber (fig. 234, × 40).

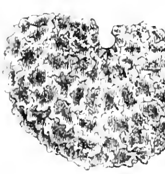


Fig. 234.

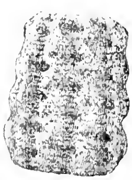


Fig. 235.

GREAT MULLEIN (*Verbascum Thapsus*).—Seeds elongated, sides straight, slightly narrower towards one end. The end view bluntly pentagonal. Depressions in longitudinal series. Colour, dull light-brown. These seeds again are a distinct type, somewhat like a truncated cone. The seeds of other Mulleins furnish varieties of the same general form (fig. 235, × 40).

WATER FIGWORT (*Scrophularia aquatica*).—The form is more cylindrical than in the Mulleins, the texture more horny, the depressions less decided, and the general character less interesting.

CAPE CHÆNOSTOMA (*Chænostoma polyantha*).—These are pretty little amber-coloured seeds of the Figwort kind, elongated, rather angular, and covered with parallel transverse linear depressions.

CAPE NIGHT STOCK (*Nycterinia capensis*).—These seeds almost baffle description; no two of them are precisely alike: the general form is angular and irregular, with a collapsed appearance. The colour is a delicate primrose, and the surface granulated like a piece of shagreen (fig. 236, × 40).

EYEBRIGHT SEED (*Euphrasia officinalis*).—More elongated than the majority of seeds in this order, with the ends attenuated. The body of the seed nearly black and glossy, with longitudinal membranaceous dirty-white ridges. Between the ridges are faint transverse striæ (fig. 237, × 40).

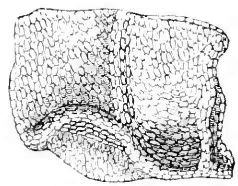


Fig. 236.

Fig. 237.

CRIMSON ALONZOA (*Alonzoa Warczewiczii*).—Elliptical or ovate, with four or five parallel longitudinal shallow grooves. The surface rough, with granular projections. Colour, a shining brownish-black, as though coated with asphalte.

COMMON COLLINSIA (*Collinsia bicolor*).—Oval in outline, convex on one side, concave on the other, with the margin turned inwards. Texture horny, and of a shining brown, covered on the convex side, and the margin which is rolled over the concave side, with pale hexagonal reticulations (fig. 238). The form approaches closely to that of some of the species of Plantain (*Plantago*).

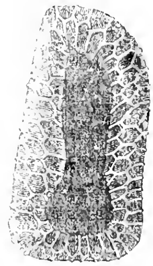


Fig. 238.

Fig. 239.

OVATE PENSTEMON (*Pentstemon ovatum*).—Very irregular and angular, often presenting nearly a triangular face. Brownish, or blackish-brown, paler along the angular edges. Surface rough, with a fugitive superficial reticulation.

CLIMBING LOPHOSPERMUM (*Lophospermum scan-

dens).—The centre of the seed dark brown, covered with conical striate papillæ, or spicate projections. Margin with a semi-transparent wing on each side, lobed and waved at the edge, meeting above and below. Outline polygonal. Wing-membrane fragile, with radiating striæ, colourless at the edge. Very beautiful (fig. 239, × 40).

IMPERIAL PAULOWNIA (*Paulownia imperialis*).—Another winged seed, very distinct from the last. Outline elongated, almost fiddle-shaped. Wing colourless and transparent. Smaller and similar membranaceous frills extend along the surface of the seed between the wings. The wings have a peculiar frilled and furbelowed appearance (fig. 240).

Fig. 240.

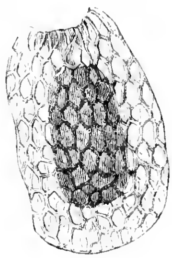


Fig. 241.

GERARDIA SEED (*Gerardia communis*).—An extraordinary seed, unfortunately very rare in this country. The oval, amber-coloured seed is enclosed in an apparently loose hexagonal network of a dark brown colour, like a bird in a cage. The genus *Gerardia* is common in North America, but whether the same type of seed prevails amongst the other species we cannot tell. If so, they are most desirable microscopical objects (fig. 241, × 40).

BARCLAY'S MAURANDIA (*Maurandia Barclayana*).—Curious, irregular, lobed seeds, resembling ten or twelve minute seeds agglomerated together into one, of a dull cocoa-brown colour, like fragments of burnt sugar, with a rough reticulated surface (fig. 242).

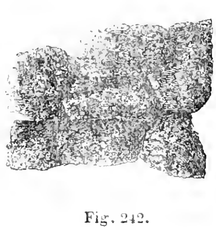


Fig. 242.

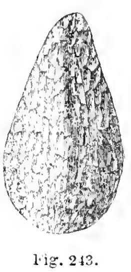


Fig. 243.

MARSH RED RATTLE (*Pedicularis palustris*).—Pear-shaped, shining, with a curved cleft or groove on one side. The surface finely reticulated. Colour, chocolate-brown (fig. 243, × 40).

The examples which we have given are all derived from one natural order, and these of such variable character as of themselves to furnish an interesting series. From our own experience, we have come to the conclusion that the majority of the Scrophulariaceæ would furnish good microscopical seeds. Hitherto we have hardly met with an exception, and if we were called upon to recommend any one order of plants the seeds of which should be collected, at home or abroad, for microscopical purposes, we should not hesitate to recommend, first of all, the Figworts, or Foxglove family, the Scrophulariaceæ.

We had hoped that space would be left us to furnish illustrations from one or two other families of plants, but these must be postponed till a future opportunity; meanwhile, and before all our wild flowers or garden plants have shed their seeds, we advise those who never collected them before to do so at once, and add a few slides of the seeds of this family at least to their cabinet of microscopic objects.

POLYZOON FROM VICTORIA DOCKS.

A RECENT excursion to the above-mentioned locality has furnished me with a representative of the Polyzoa, which may be familiar to many of the readers of SCIENCE-GOSSIP, but which has hitherto baffled all attempts on my part to identify.

Its characteristics are as follows :—

Cœnecium confervoid, membrano-corneous, irregularly branched, not composed of distinct cells, but throughout freely communicating. Lophophore orbicular, furnished with neither epistome nor calyx. Tentacles eight in number, cell-orifices surrounded with a circlet of setæ.

The above characters suffice to allot the specimen to its proper order and sub-order—firstly, that of the *Infundibulata*, wherein the lophophore is circular; and secondly, that of the *Ctenostomata*, including those infundibulate forms wherein the cell-apertures are guarded by protecting setæ. Beyond this further progress is barred, it possessing characters common to many, but restricted to no one genus quoted by such authorities as I have had the opportunity of consulting.

One of the first questions presenting itself is, whether it may be regarded as a fresh-water or marine representative. The balance of evidence appears to be in favour of the latter supposition, for although found intimately associated with cordylophora (the specimens I examined being parasites on its polypary), which will exist for a time in fresh water, an attribute considered by Professor Allman of sufficient import to rank it as a fresh-water inhabitant, yet there are other denizens of the same waters which possess essentially marine proclivities, speedily falling victims to grim death on being immersed in the pure element, but readily accommodating themselves to the denser medium of undiluted sea-water. The subjects thus experimented upon were speci-

mens of the Mysis or Opossum Shrimp, a most interesting abnormal genus of the crustacea, partaking much of the external form and appearance of the true shrimps, but on closer examination exhibiting peculiarities of structure completely isolating them from these, and which may form the subject of another paper. In conclusion is appended a brief reference to those polyzoons which most closely approximate the form here treated upon.

Valkeria shares in common with it eight tentacles, but the cœnecium is of a more complex structure, consisting of a branching polypidom, on which are clustered distinct cells, containing the individuals; setæ moreover are not represented. Bowerbankia, on the other hand, cultivates bristles, but is a compound householder, and is, in addition, the happy possessor of a complex and characteristic gizzard. Professor Allman, in his magnificent monograph of our indigenous fresh-water species, describes two infundibulate forms—Fredericella and Paludicella: the number of tentacles are in each, however, considerably in excess, and in other points they diverge considerably.

Fig. 245.

Fig. 244.

The accompanying illustration suffices to show the relative position of the various parts. Fig. 244 is the aspect presented under the one-inch objective, showing at *a* the animal fully expanded, and at *b* the same retracted; the tentacles are represented at *t*, and the half-projecting setæ at *s*; these latter may be entirely withdrawn. Fig. 245 represents a group of these polyzoons under a lower power.

W. S. Kent.

[We have been informed that this Polyzoon was taken by other members of the Quekett Microscopical Club at an "excursion" to the Docks.—Ed.]

DADDY LONGLEGS.

For some few days past we have been struck with the apparent suicidal mania among the renowned "daddy longlegs" (*Tipula oleracea*), which tempted them into the house, seemingly with the express intention of yielding themselves willing victims to the flames. To-day, however, September 19, the climax was reached.

Early in the morning our worthy milkman sent to us to know if "anything was a-going to happen," for "he never see sich a sight in all his life;" he was sure that if there was one there was a hundred thousand million, and the "posteses" were covered that thick that you couldn't see the wood, and the ground was covered with them; and did they bite? After assuring him that they most probably did not portend any dire calamity, and that they did not spit fire, he went on his way rejoicing, and we sallied forth to view the wondrous scene.

The night had been wet and windy, and the enormous pools of water which, on such occasions, always form on the London Fields, to the credit of the Hackney Board of Works, presented a most singular sight. In some places they were literally covered with corpses, stiff, cold, and damp. They lay like the army of Sennacherib, unsmote by the sword. The remnants of the slaughtered host, a goodly number, were hopping and staggering about in a quasi-inebriated manner. All the railings and seats in this rural spot were covered with the discomfited multitude, huddled up two and three thick, as if for warmth. The pathways, on which they were not so easily distinguished, owing to their approximating closely to the colour (or discolour) of the gravel, were alive with them, all skipping about like frantic schoolgirls on a half-holiday. Few, very few, were seen flying like decent insects. I do not scruple to say that there must have been hundreds of thousands on the London Fields, and all the neighbouring roads swarmed, while the Hackney Downs were literally covered with them. How far they extended in other directions I do not know.

In the evenings they were enabled to commit suicide in a most pleasing manner. As I have said, they forced their way into the house, and more than one, panting doubtless for fame (not f-l-ame), drowned or boiled himself in cups of hot tea; others showed their desire for renown by doing all in their power to get shut up in books; but by far the greater number, influenced doubtless by high sanitary motives, adopted the cinerary system, and burnt themselves up in a most praiseworthy manner. Lighted candles were great favourites, so one was especially devoted to their service. No sooner was it lighted than a performer came bump into it, sticking his clumsy body into the melted wax to prevent his falling off, and deliberately frizzling his

long legs, delighted apparently with the spitting, spluttering music thereby produced. Having succeeded in reducing the length of his pedal extremities, he endeavoured to waltz, but, finding it was inconvenient, scrambled up again, and made away with his wings, after which he yielded up the ghost.

The next performer came bang at the wick, fried his wings, stuck his head in the light, and kindly moved away to make room for the next comer, who, as he could not announce himself with a flourish of trumpets, dashed to the stage, fixed his head firmly in the soft wax, and gracefully threw a summersault into the flame, literally bursting with the warmth of his joy. At times six or seven might be seen wheeling round and round the light, and then dashing full tilt into the more than tropical climate. Whether it was a feast of dedication to Ignis, or whether, having been converted to the theory of descent with modification, they were endeavouring to transform themselves into salamanders, I cannot say. I only know that they kept the game up for several days, and now (October 1st) hardly one is to be seen. So ends my tale. S. B. J. S.

A PLEA FOR THE SEA-BIRDS.

By the Rev. Richard Wilton.

Stay now thine hand!
Proclaim not man's dominion
Over God's works by strewing rocks and sand
With sea-birds' blood-stained plumes and broken pinion.

Oh, stay thine hand!
Spend not thy days of leisure
In scattering death along the peaceful strand
For very wantonness, or pride, or pleasure.

For bird's sake spare!
Leave it in happy motion
To wheel its easy circles through the air,
Or rest and rock upon the shining ocean.

For man's sake spare!
Leave him this "thing of beauty"
To glance and glide before him everywhere,
And throw a gleam on after-days of duty.

For God's sake spare!
He notes each sea-bird falling,
And in Creation's groans marks its sad share,
Its dying cry—for retribution calling.

Oh, stay thine hand!
Cease from this useless slaughter;
For though kind Nature from the rocks and sand
Washes the stains each day with briny water,

Yet on thine hand,
Raised against God's fair creature,
Beware lest there be found a crimson brand
Indelible by any force of Nature.

ZOOLOGY.

Puss-Moth Caterpillar Spitting.—Having often noticed the caterpillar of the puss moth (*Cerura vinula*), when disturbed, to eject a fluid with considerable force, I was curious to see how it could do it, and where it came from; but I had to pay for my curiosity. One fine hot day in August I found a large caterpillar, and held it up to examine it, when it suddenly spat a fluid right at my eye. I have not yet forgotten the pain it caused; but, on getting it well bathed with cold water, the inflammation abated. Nevertheless, I saw what I wanted: the fluid is not ejected from the mouth of the caterpillar, but from a transverse slit below the mouth, in the first segment. After it has jerked out its fluid once, it cannot do so again for a considerable time—in fact, not till it has brewed again.—*A. M.*

Lepidoptera in Lucerne-fields.—Many have doubtless observed the partiality of insects of all kinds for fields of clover (*Trifolium pratense* and *incarnatum*). It is in such localities that the clouded yellows (*C. edusa* and *C. hyale*), and many rare day-flying *Noctuæ*, such as the genus *Holiothis*, are to be looked for. But as regards the attraction it possesses for butterflies and moths, a lucerne-field throws one of clover entirely into the shade; and I, for my part, have little or no doubt that if this plant, the *Medicago sativa* of Linnæus, was more generally cultivated in this country, several species of butterflies and moths now considered extremely rare would be found either flitting about the purple blossoms or quietly settled on them. I have been enabled, during a lengthy stay in the neighbourhood of Coblenz, in Germany, this summer (where this plant is very extensively cultivated), to observe for myself how attractive its flowers are to nearly every butterfly found in England. Three in particular (two of them extremely rare in Britain, and one not common) are among the most abundant—viz., *Colias hyale*, the pale clouded yellow, which nearly, if not quite, outnumbered the *Pieridæ; Pieris daplidice*, the Bath white; and *Argynnis lathonia*, which was extremely common. I have caught as many as four in my net at once. All the British species of Papilis, Gonepteryx, Satyrus, Colias, Argynnis, and nearly all the Vanerridæ I found on this medick (*C. edusa* the only one I found not abundant, although I have heard since, from my brother, that it had been more frequently seen lately), together with several European species, such as *P. podalirius*, *S. Hermione*, *S. mæra*, and others. These fields were likewise very attractive to moths, both day and night-flying. I will only mention one of the many I observed, *Agrophila sulphuralis* (the spotted sulphur), hitherto only observed near Brandon, in Suffolk, in England, which should be looked for in the few localities in this

country where the plant seems to be generally cultivated: I have noticed several fields of lucerne about Folkestone and Dover. Can this be a reason for Hyale and Lathonia being more frequently found on this part of the coast than elsewhere? I firmly believe that were these fields, where they occur, searched more dilligently, more than three or four Lathoniæ per annum, and a stray Daplidice, would be captured. I see in the present month's (October) number of SCIENCE-GOSSIP, page 233, an account, by Mr. Leslie, of the capture of two Queens of Spain (*Fritillaries*), and an observation of the frequency of Hyale this year, at Deal and Dover, which seem to corroborate my opinion.—*T. Cosmo Melvill.*

MIGRATORY INSTINCT IN THE DOMESTIC GOOSE.—The natural instincts of animals are wonderfully persistent. Centuries of domestication, giving little opportunity, and certainly no necessity, for their display, are unable to obliterate them. Thus my little pet spaniel, of King Charles's breed, whose ancestry and training tend to suppress such a habit, makes certain most unnecessary gyrations before settling himself to rest on the sofa, just as I suppose the aboriginal dog did in his bed of rushes. The goose has been long domesticated, and yet I observe yearly the old migratory instinct still in force. At Polperro, on the south-east coast of Cornwall, it was common for the geese of the littoral homesteads to take long flights to sea about this time of the year (September), and their owners had some difficulty in reclaiming them in boats. On the midland moors of Cornwall I have just observed a long and well-sustained flight of geese, evidently under this impulse, and confident in their newly-developed pinions.—*Thomas Q. Couch, Bodmin.*

EEL BABBING.—Another way of taking eels, and by far the more ingenious, is that known as "babbing," or "bobbing." A series of large worms are strung on cobblers' worsted and coiled into a knot. This is fastened to the end of about six feet of strong cord, and a weight is attached about three inches above the bait. The line is then tied to the end of a stout hazel pole; and, provided with this simple tackling, about nine o'clock in the evening you row to a part of the river or Broad, where there is a tolerably clear bottom. Having made fast the boat, and, of course, lit a pipe as a preliminary, you gently let down the line until you feel the bottom with the weight. It is then drawn up again until the bunch of worms just trails on the ground. Many minutes will not have elapsed before you feel an electrical sort of jerk travelling down the pole into your right arm. Another tug, more powerful than the former, and quickly, but without any plucking, you raise the line over the boat, and in flops a big eel! I have known a couple of "babbers" to take as many as four or five stone of eels in a single night. No small amount of practice is required to drop your prey into the boat. If the eel happen to be unusually large, the chances are that you tug at him so strongly that, when you lift him out, the impetus carries him over the boat, and drops him in aqua pura on the other side. I have enjoyed few sports more than "babbing." The clear starlight overhead, the sighing and soughing of the wind among the reeds, the ripple of the water against the boat, and the strange sounds which break upon the ear at night, are calculated to produce an effect upon the mind never to be forgotten.—"*Norfolk Broads," in St. Pauls Magazine.*

SPHINGES CONVOLVULI have appeared in considerable numbers this year in our neighbourhood. On the evening of the 20th of August I saw six in our garden, three of which I captured. They are all very fine specimens, one of them in particular being as perfect, in every marking on the wings and cilia, as if newly from the pupa; thus, I think, proving them to have been bred in the immediate neighbourhood. They all came to a bed of gladioli (about fifty spikes of which were in bloom at that time), never stopping to look at beds of geraniums or verbenas which were close by. They sailed beautifully round the bed, then, suspiciously eyeing me, gave a wheel or two round my head before settling down to the flowers. So I learned to keep quite still till they had fairly commenced to dive their long probosces into the corollas of the gladioli, when I could go quite close up to them without disturbing them. They invariably began at the lowest flower of a spike, and going up flower by flower till they had tried every bloom in the spike, making a loud, deep humming with their rapidly vibrating wings, which I could hear distinctly about ten yards off. After the 20th the evenings were either cold, wet, or windy; so I saw no more of my visitors till either the 26th or 27th, when, on going to my gladioli bed, I heard one humming, but it was too dark to see it. On creeping round the bed, and trying to see it against the sky, I was startled by a sudden rush amongst the plants, and, on looking round, I saw my cat dart into the house. So I followed it, and found pussy had been too quick for me; but she came and laid it down at my feet, evidently quite proud of her capture. She had killed it, but had injured it very little as a specimen. Last year I observed two in the same manner, at gladioli; but it was later on in the season, I think the second week in September. I have never seen the caterpillar of this fine moth. I should like to know if it has been observed this year by any person.—*Amos Mitchell, Wolsingham, Durham.*—A very good specimen of this moth was brought to me about the 20th of September, caught near Oxford.—*B. B. Scott.*

S. Convolvuli has been very plentiful in this district this autumn, there having been six specimens taken and many others seen. They were all taken hovering round gladioli, none being noticed near any other plant. The two largest measured four inches and three-quarters from tip to tip. There have also been seen two specimens of *Deilephila livornica*, one of which (a fine one) was captured.—*A. P., Wolsingham, near Darlington.*

S. Convolvuli alighted on board the *Lord Raglan* when about five miles off Tynemouth. It is a fine specimen, measuring across the wings four inches and three-quarters. It is now in my possession.—*W. M. H.*

How a Rat Stole Eggs.—The rats having made free with my eggs, I determined to watch the process of lowering them from the shelf on which they were kept. Having concealed myself, I soon saw a rat mount the shelf, nearly three feet from the ground, take an egg between his claws and break at one end a hole large enough to insert the end of his jaw; clasping the egg against his stomach with his two paws, and steadying it with his jaw in the hole he had made, he walked backwards to the edge of the shelf, and then deliberately threw himself down, so that he fell with his back on the ground, and the egg nestling at his stomach. He turned over, and was decamping with the egg, but I stopped him and recovered it, unbroken, save the little hole at one end in which he had inserted his jaw.—*C.*

Wasps.—Being tormented this year by an infinity of wasps, I was advised to catch them in a bottle which contained cyanide of potassium mixed with plaster of Paris; this proved very successful, killing them in a few seconds. Observing some of them were of a *carmine* colour (a few of which I enclose), both myself and friends believed we had found a new variety. Further investigation has, however, proved they are *Vespa germanica* materially changed by the influence of the cyanide, and it will be interesting to know if other objects are altered by a similar process; for if so, it may prove an objection to its use.—*W. T. Iliff, Epsom.*

BOTANY.

Early Flowering in Spring, 1868 (p. 189).—My own experience quite coincides with that of my friend Mr. Stewart. During the four years I have resided at High Wycombe, I have kept a calendar of the flowering of our wild plants; and, with scarcely an exception, all have been earlier this year than in the three preceding. On an average, most species have been, at least, a week in advance, many ten or twelve days. Our spring flowers were unusually abundant and luxuriant, but the heat of June entirely spoilt our summer-blossoming species. Our hedges, usually so brilliant, were in July almost bare of flowers; and those which did put in an appearance were, for the most part, stunted and dwarfed by the heat. In Cheshire the same state of things prevailed: most of the August flowering plants had blossomed in July, and many of the bog-plants of the moors made no appearance at all. In North Wales I was disappointed at finding that many species, which I had hoped to collect in full flower, were far advanced, and in many cases out of blossom.—*B.*

Puffballs and Fungi.—There have been in Science-Gossip some very interesting papers on the edible qualities of different fungi. The gigantic puffballs, called in Norfolk ? Bulfirs, are most delicious and wholesome when properly cooked. I got a very large one the other day, and had it cooked. Two ladies were stopping with us who did not know such things were fit to eat, and would not touch it till I had had some; when, seeing *no harm* come, they ventured to taste, and were equally pleased and astonished at its goodness. It requires to be fried with a little butter over a very slow fire, in slices about an inch thick, and I think is best eaten with a little pepper and salt on toast. Few persons seem to be aware of the use of the fairy-ring mushroom for flavouring. It gives a delicious taste to different preparations of meat, and cannot very well be mistaken when once seen. It should be gathered and dried gently, and a little pounded when wanted. It has a great advantage over the mushroom, that it dries easily, and doesn't seem to be infested with grubs.—*E. T. Scott.*

Old Trees.—It is probable that there are yet many very remarkable trees scattered over the country which have not yet had their features recorded. I do not know if there has ever been mentioned by any one, among other celebrated oaks, one that grew in Holt Forest, in Hampshire, which fell a victim, along with many other old patriarchs of the forest, in the time of the great French Revolution, in consequence of the great demand for material for ship-building. This monster girted, at eight feet from the ground, thirty-five feet, and, according to tradition, this size, within an inch, was the same a hundred years previous. The finest trees I have ever seen were growing in and around the neighbourhood of Cowdray Park, in Sussex. The soil here abounds in sandstone, which I believe is very congenial to their growth.—*George Newlyn.*

Fontinalis antipyretica.—I enclose a specimen of *Fontinalis antipyretica* in fruit, taken from a pond lying between Carthagena and Cossington Lodge. Perhaps some of your readers may have observed the abundance of its fruit this year, and that it is not so much owing to the situation as the season that this abundance may be ascribed.—*F. G. T.*

MICROSCOPY.

Dipping-Tube.—Allow me to call attention to a form of dipping-tube that has been extremely useful to me this season, and which I feel sure will be found to have many advantages over the simple glass tube in general use. It consists of a piece of glass tube (*a*) from three to five inches (or more) in length, and about quarter-inch bore, to one end of which a piece of indiarubber tubing (*b*) about half the length of *a*, and of sufficient bore *just* to admit the glass tube, is fastened, by binding thread tightly round, as at *c;* the other end of *b* is stopped with a small plug of wood, and also tied with thread as at *d;* the action of which, by pressure of the thumb and finger, is too simple to need description. Any quantity of liquid can be introduced and expelled at will, or be retained in the tube until required for examination, without the inconvenience of being (as before) compelled to keep one end stopped with the finger. In extremely shallow water, the advantage is very sensibly felt, and I trust will prove useful. —*H. Dalton.*

Fig. 246.

A House-fly (*Anthomyia pluvialis*).—I have often observed, especially during the past summer, a large number of a species of fly, mixed with the

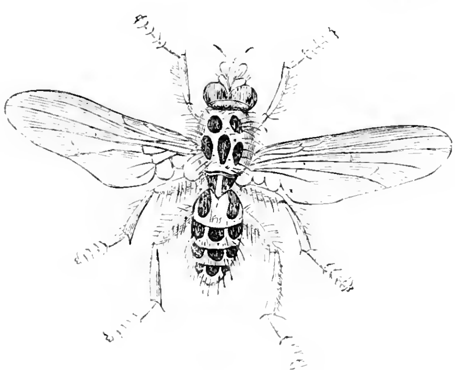


Fig. 247. *Anthomyia pluvialis.*

common house-fly in the windows of shops and private houses around the metropolis. This is determined as a species of *Anthomyia*, named above, which is said to be the forerunner of rain; hence its specific name. It is about the same size as the common house-fly, perhaps not quite so large, paler coloured, and more distinctly marked, as will be seen from the figure. What appear to me to be the eggs of this species are beautiful microscopical objects, long and narrow, covered with hexagonal pits, and with a wing-like expansion on each side throughout the entire length, reticulated in a similar manner but with shallower pits.—*M. U. S.*

Journal of the Royal Microscopical Society.—The Royal Microscopical Society having ceased connection with the *Quarterly Journal of Microscopical Science*, in which for sixteen years their Transactions have been published, have announced to the Fellows their intention of publishing their own journal in future, under the editorship of Dr. Henry Lawson. Messrs. Churchill have also made the announcement that the *Quarterly Journal of Microscopical Science* will continue to be published by them as heretofore, without any change in the editorial department.

Deep Sea Dredging in the Gulf Stream.—At the meeting in August of the United States National Academy of Sciences, a paper was read by Count Pourtales, who has recently been employed by the Coast Survey to dredge the bottom of the ocean along the course of the Gulf Stream, in parallel lines, crossing the current, the lines being about ten miles apart. In starting south-easterly from Florida, he found the bottom for four or five miles made up of the common coral sand of that neighbourhood, with very scanty traces of life. The next area, from 90 to 300 fathoms, and the first part of the way forming a plateau, is a rocky floor, made of very hard limestone, derived from living shells. Life was abundant, consisting of lamp-shells, starfishes, crustaceans, and molluscs generally. There were also many bones of the manatee, a dolphin-like animal, usually found living in shallow water. The third area was the regular and common ocean-bottom, from 250 to 300 fathoms, covered by the chalky remains of foraminifera—those minute animals found several years since on the telegraphic plateau in the North Atlantic. He also exhibited a map of the bottom of the ocean off the coast, and found first, extending from the north of Florida to Montauk Point, near Block Island, Rhode Island, a bottom of siliceous sand, perhaps 100 miles wide. Outside of it was a calcareous bottom, occupying the whole area south of Georgia. Between the two, off the Carolinas, is a limited deposit of green sand, containing the foraminifera. A letter was read from Professor Agassiz, warmly eulogizing Pourtales' papers, and saying that he had solicited the honour of publishing the maps and other results in one of the volumes issued at the Museum of Comparative Zoology in Cambridge, Massachusetts. It opens, he said, an entirely new chapter in natural history. It disclosed what had never been before known, the various fauna at the bottom of the ocean. Among the animals obtained were some that had been extinct since the cretaceous and tertiary periods.—*New York Times.*

NOTES AND QUERIES.

House Ants.—In reply to the letter from "One tormented with Ants," which appeared in the *Times* of Saturday, we have received communications from various parts of the country, showing how generally these insects have this summer caused annoyance in dwelling-houses. Our correspondents recommend various remedies. "S. A. K." advises that the cupboards and other places invaded by the insects should be sprinkled with the liquid ammonia used by chemists, and known as "liquor ammoniæ fortiss., ·880," "a substance most efficacious in killing black-beetles." "A Past Sufferer" has found that if the places frequented by the insects are washed with a solution of alum, they will soon disappear. "One who has been tormented with Ants" has found that they disappeared from his pantry after the spots frequented by them had been sprinkled with creosote. "Antidote," who writes from Liverpool, states that his house was overrun with ants during the past summer. He tried various remedies, but in vain, until a few days ago, when he put camphor in small bags, and placed them near the places most infested, and he finds that the insects are fast disappearing. "S. M. O." found that "soft soap, mixed with a large quantity of water," smeared in all their haunts, had the effect of expelling them.—*Times, Sept.* 16. —A correspondent in the *Morning Star* recommends placing a vessel of rum thickened with brown sugar in their way. In this manner he states that he has caught hundreds.

Devon Mosses.—Will any correspondent who has collected mosses, lichens, or scale mosses, in Devon or Cornwall, communicate the names and localities, especially of the rarer species to E. M. Holmes, 2, Arundel Crescent, Plymouth?

Spiders.—May I request any of your readers who don't believe in spiders' bites to do as follows? Let a large hungry garden spider run down the back of a finger, and suddenly arrest him by dropping a finger on his hind pair of legs. He will not turn round, but plunge his falces in and work them about well, soon convincing "the patient" that spiders' fangs have some venom in them. No evil results beyond a slight white blister follow. As for the viscid globule—dotted threads of Epeira—I think the spinnerets are pressed inwards, so that a thick solid thread of liquid silk escapes. This naturally runs into globules: its counterpart may be produced by a very rude process: simply moisten thumb and finger in the mouth, press them together and carefully separate them, when a clotted thread will connect them. In the Epeira thread the globules remain viscid, the connecting thread solidifies.—*W. F. H.*

Fern Insects.—The insect so injurious to "A. A.'s" ferns is the Black Thrip (*Thrips Adonidum*), one of the most troublesome pests the cultivator of ferns, azaleas, gloxinias, and many other plants has to contend against. The most effectual method I have found is frequent fumigation with strong tobacco, and a free use of the syringe.—*C. Ward.*

Cuckoo, Cuckoo!—A friend, while out bird-nesting during the season of the present year, found at the same time four nests with eggs—viz., two Reed Wrens (*Silvia arundinacea*), a Whitethroat's (*S. cinerea*), and a Sedge Warbler's (*S. phragmitis*), all within an area of fifteen yards. In each of the three first-mentioned nests was found a Cuckoo's egg. Perhaps some of your readers may be able to say whether it is probable these eggs were laid by the same cuckoo or by three different ones, and also how the cuckoo deposits her egg in the nests of such small birds, where it appears in some instances impossible for a bird of her size to lay one. I should think in the nests of the above-mentioned birds it would be a difficult matter for a Cuckoo to lay an egg. I found a Pied Wagtail's nest a few years ago, with a Cuckoo's egg in it: this occurred for two following years; the nest was each year in exactly the same place, at the foot of a tree overhanging a running stream, and about three feet from the water, and in such a position as would be almost impossible for the Cuckoo to lay its egg. I should think they must first lay their egg on the ground, and then deposit it in the nest of the small bird with their beak; but perhaps some of your readers who may have studied the habits of this curious bird can enlighten us further about it.—*S. W. U., Norwich.*

Growth in a Lemon.—A few days ago I had occasion to use a lemon, and on cutting it up I found to my surprise that some of the seeds in the interior were not in the usual condition, two of them having sprouted, and a third being about to sprout, the shoots arising from two being nearly an inch long and perfectly green. I have not had any experience of a similar kind, and a fruiterer to whom I mentioned the matter informed me that, although he had cut up hundreds of lemons, he had never found any seeds sprouting in their interior; it is further singular that the sprouted seeds were in the interior of a distinct cavity, in the centre of the lemon. I forward the seeds for inspection.—*Alfred Hume.*

The Starling.—Referring to the note in your last number of a curious habit of the Starling, I would add that at one p.m. on the 19th August, 1866, I observed birds seemingly hawking for insects. Far, however, from making clumsy attempts, their evolutions were so correct, as for a moment to deceive me. The swifts had left the spot, migrating but two days before, and until I came under the place where the birds were hawking, I mistook them for swifts. The apparent marvel of the return of the swifts, awoke an interest in making certain of the kind of bird. On nearer view, instead of swifts, the birds proved to be starlings. I watched for some time, and left them hawking. The sustained power of flight exhibited by the birds seemed, at first glance, extraordinary; but on calling to mind the wonderful evolutions of flocks of starlings, so often seen for hours on autumn evenings, the power of flight ceased to seem anything out of the common way. These starlings bred in the roof of a house close to where they were flying. It is also a breeding-place of swifts, and the hawking appeared to me to be a singular manifestation of imitativeness. No other instance of a similar occurrence has fallen under my notice. More recently, however, either in Science-Gossip or in some kindred periodical, the note of a naturalist appeared, recording the observance of a similar whim of the Starling.—*J. H. Bozward, Worcester.*

Venomous Bite.—The other night I felt something just inside my ear. I laid hold of it, and pulled it out, and I suppose the sudden assault

alarmed it; at any rate I felt it bite, and in an instant the most violent pain came on, and the ear and surrounding parts became much swollen and inflamed; and felt as if something was burning. I got up and applied some washing soda and a little opium, the best application for wasp stings, but though the pain soon went off, the swelling did not go down for about a day or two. In my haste I threw the creature, whatever it was, on the ground, especially as I did not expect any particular effect from the bite. The only thing I could find was an earwig at the top of the bed curtain. We know the tale about *them*, but I never heard that their bite was poisonous. Have they got poison-fangs? But perhaps it was a spider, which wished to give me a practical proof that they can both bite hard and poison the wound. At any rate it was extremely painful—*E. T. S.*

Lemna gibba.—I can confirm the observation of W. W. as to *Lemna gibba* being found in running water. I found it in a branch of the river Wandle, on Mitcham Common (Beddington corner side), asociated with *L. minor* and *L. polyrhiza*. The stream runs with moderate swiftness, and is quite clear; the plants growing on either side of the stream, among Water-mint (*Mentha aqualis*) and Hemp Agrimony (*Eupatorium cannabinum*).—*A. B.*

Fuchsia and Bees.—The blossoms of a common fuchsia in my garden have this autumn been tapped by the bees in a most extraordinary manner. In the long tube-like neck of the pendulous blossoms a hole of considerable size has been drilled, and in some instances too, one near the top, and the other near the bottom of the tube. I can scarcely detect a blossom that has not been pierced. It appears to me that these perforations are made by a smallish species of humble bee, with a white-tipped tail, one broad band of yellow upon the body, and a similar one across the thorax. The blossoms of a large species of globe fuchsia growing close by are untouched.—*F. T.*

Second Spring.—Your correspondent "L." mentions the flowering of blackthorn in September as an example of the extreme mildness of the autumn. On the 1st of October, while walking in the garden, I noticed that the strawberry plants had commenced to flower again in some places. In one case the fruit had attained to a considerable size.—*W. H. Largs, Ayrshire.*

"Spider Architecture."—My attention was this morning drawn to a singularly constructed spider's web. The spider, a large Diadema, had apparently commenced her labours by fastening a number of threads to the eaves of a low roof, about 7 feet high, of a corridor. The extreme points of the outer stays were about 4 feet apart. These fibres were united at a distance of about 3 feet from the roof, thus forming a triangle. From the point of union a single strand was carried down to within 2 or 3 inches of the ground. To the end of this cable was suspended a small triangular stone, about ½ an inch across and ¼ of an inch thick. It is evident that the stone must have been fastened to the glutinous web as it lay upon the earth, and subsequently drawn up. The fibre suspending the stone was so fine that it could only be seen with difficulty and from certain positions. As the wind caught the web, it caused the stone to vibrate gently; the motion thus communicated to the geometrical part of the web was all but imperceptible. This seems a departure from the spider's usual mode of working, and shows considerable ingenuity on her part. What was her object in the adoption of this novel plan? It appears clear that one such thread as was here employed, if firmly fixed to the earth, would be unable to support the web against the force of the wind; whereas the weight of the stone was not only sufficient to retain the web in a perpendicular position but also to keep it steady while the power thus obtained of yielding to the wind ensured its safety from destruction. Have we not here something more than what is generally understood by the vague term *instinct?* In order to see, and apply means to remedy the defects of construction, does it not require *reason?—John Hepworth, St. Mary's Vale, Chatham.*

Clouded Yellow.—I caught a male specimen of this maritime butterfly in the uncultivated part of the Horticultural Society's Gardens (South Kensington). Have any of the correspondents of Science-Gossip ever found it in the suburbs of London?—*H. H. O'Farrell.*

Colossal Cephalopod.—Being somewhat familiar with the magnificent collection of zoological specimens in the museum of the Royal College of Surgeons, I have made a particular point of ascertaining how much foundation there existed for the rumour of its containing the mandibular apparatus of a Cephalopod of such dimensions as referred to in your last. In the physiological series of the above-mentioned institution, there is a specimen preserved in spirit, which, although not quite equalling the size quoted, "that of a man's hand," is evidently the one alluded to. Reports, like gases, possess an innate tendency to expand. The length from the apex of the beak to the extreme posterior termination of the horny tissue is just four inches, and the depth, taken at right angles to the long axis, measures a little over two inches and a half. The component mandibles are invested with a considerable amount of muscular and connective tissue, which of course adds much to the apparent bulk. The specimen is Hunterian; the animal itself was captured, floating in an exhausted condition, in the open sea off Cape Horn, by Sir Joseph Banks and Dr. Solander, and is said to have measured six feet in length. It belongs to the genus *Onychoteuthis*, a representative of the *Decapoda*, and took its specific name of *Banksii* in honour of its captor. Unfortunately, only the buccal apparatus, and the posterior portion of the body bearing the characteristic lateral fins, were preserved, and no record has been left as to what regions of the huge mollusk were included in the above measurement, whether only those of the body proper, or that of the extended arms as well; the dimensions of the tail-piece, however, if I may be allowed to make use of a convenient term, favour the first-mentioned supposition. It may not be out of place to mention here, that readers of Science-Gossip having a little leisure at disposal, will be well repaid by a visit to the museum, containing the specimen just brought before their notice. Many of the queries daily inundating its devoted Editor, might there be solved in a practical manner, which, no one hardly will venture to dispute, conveys to us a far more substantial knowledge of any subject than can be possibly gained by the mere perusal of letter-press. It appears to be not generally known that the Museum of the Royal College of Surgeons is practically accessible from eleven till four every week-day excepting Friday and Saturday.—*W. S. K.*

Terror at a Bat. — The paragraph in your October number, headed "What's in a Name?" reminded me of an incident which may perhaps amuse some of your readers. One night, in the hot weather last summer, I was sitting alone, reading, when I was suddenly interrupted by the cook, who informed me, in terrified accents, that there was a Horse-stinger in the kitchen. Unable for the instant to comprehend what she could possibly mean, I proceeded to the spot, and found that the dreaded monster was nothing more than a poor bat, that had probably entered by the open door, and not at all relishing its new quarters, was wildly flying round and round the gas-light. I easily captured it, and found it to be one of the long-eared species, *Plecotus communis*; but it was some time before I could prevail upon the awestruck cook to approach it, and even then she was by no means sure that the beautiful little creature was not after all a Horse-stinger. I did my best to point out to her its wonderfully delicate structure, and at last wrung from her the remark, "Well, there *is* queer things as flies about at nights, to be sure!" I think that there is scarcely anything more painful to a lover of nature than to see some of the choicest gifts of our Creator regarded by the ignorant with superstitious and uncalled-for fear. The evil is, no doubt, gradually diminishing, but it is still deeply rooted and widespread among the lower orders of our population.—*Edward Banks, Tettenhall, near Wolverhampton.*

Harvest Mites.—Answer to M.D.P. in Science-Gossip of October 1st, 1868.—I also, like your correspondent in last month's Science-Gossip, have had a not very pleasing experience of Harvest Mites when visiting in Lincolnshire, but have always found the application of a little diluted liquor ammoniæ effect a cure at once.—*J. S.*

Stickleback Disease.—In one part of the river Itchen, enclosed between locks, there are great shoals of the Three-spined Stickleback (*Gasterosteus aculeatus*). These fish are almost universally affected with a disease which appears in the form of round white excrescences, minutely veined, and varying in size from a pin's head to a pea. The disease attacks the head, gill-plate, and caudal extremity of the spine. These balls are soft and sensitive, and quite impede the movements of the fish. The stream runs on a chalky bottom, and contains abundance of stone loach,—but these are quite healthy. Can any reader explain the disease, and its partial occurrence?—*A. H. E., Southampton.*

Insects on Ferns.—The insects on the ferns mentioned by "A. A." must be the "Thrips." The best means of destroying them, according to my experience, is by the use of tobacco dust, which is sold at most of the seed-shops. The way I use it is as follows:—I get a piece of fine muslin about three inches square, and place some of the dust in the centre; then draw up the corners of the muslin, and tie them round, forming a loose pad; I then get the plant and jerk the pad over the part affected, which soon gets covered with the dust, and leave it until the next day, then syringe it well. I keep the pad in a tin box, so that it is always ready for use. —*J. Morley.*

Local Names of Birds and other Animals. —Any lists will be acceptable towards preparing a communication for this journal. To be sent either to the Editor, or R. Holland, Mobberley, Knutsford, Cheshire.

Spider Maternal Affection.—For some time past the pages of Science-Gossip have been replete with what doubtless has proved, to some of its readers at least, interesting information concerning the structure, character, and habits of Spiders. Some of these communications have not been of a kind likely to increase the popular esteem for the creatures that have been their subject. If any of the readers of Science-Gossip experienced a revulsion of feeling at the sight or mention of these "horrid" creatures, before perusing some of the notices in question, they must have had their sensations considerably intensified by the reading of not a few of them. This is a feeling, I confess, I have from early youth shared with many, very many persons. Spiders always appeared ugly and repulsive to me, until an incident which came under my observation demonstrated that within their unsightly exteriors there resides a spring of genuine parental solicitude and affection that would be well if found more frequently in the possession of many who boast a vastly higher position in "being's endless chain." In the course of last summer, when out for a naturalist's "constitutional," the circumstance alluded to above came under my notice, which, in justice to the "poison-fang" fraternity, I have thought ought to be told. In an old hedge, dry as dust, I found a great many varieties of spiders, which (not being acquainted with Staveley or any other of their friends) I unfortunately cannot name. One of these, a dark-coloured, grizly-looking jade, I captured, with a view to our becoming better acquainted. Under, and in immediate contact with, the abdomen, she carried a cocoon, containing (I presume) eggs or baby-spiders. In form and size it resembled a small grain of hempseed, and was kept in its place by the first pair of legs clasping it. When the cocoon was severed from her, the mother would not leave the palm of my hand on which I held them, but stood at a short distance, apparently watching intently her precious load, towards which she several times made a rush, and with a rapidity that eluded my sight, picked it up, and attempted to make off with it. I several times deprived this dutiful mother of her charge, and as often she proved that she valued her own life less than its loss. Indeed the "first law of nature," self-preservation, seemed in her case to have been suspended.—*B. Taylor.*

To Kill House Ants.—For about six years I was troubled with them. The little pests used to eat up everything they could get at; but I got rid of them at length by the following means, which I recommend to "H. E. M.":—Put some sort of bait, such as a piece of bloater, into an old teapot, and close the lid; the ants will get down the spout, and find their way to the piece of fish, where they will stop for days together. About every other day pour boiling water into the teapot, clean it out well, and set the trap again.—*P. T. Palmer.*

Ailanthus Moth.—I had some young larvæ of Ailanthus moth given me this summer. They changed into pupæ about the end of July, in which state I expected them to remain until next spring, but the moths came out at the beginning of September. Is that the usual time for them to remain in the pupa state, or is it on account of the hot weather?—*B. B. Scott.*

Privet Sphinx Larva.—In reply to W. Bradford, I beg to state I have often seen the larva of the Privet Hawk-moth feeding on dogwood.—*H. Chalwin.*

NOTICES TO CORRESPONDENTS.

All communications relative to advertisements, post-office orders, and orders for the supply of this Journal, should be addressed to the Publisher. All contributions, books, and pamphlets for the Editor should be sent to 192, Piccadilly, London, W. To avoid disappointment, contributions should not be received later than the 15th of each month. *No notice whatever can be taken of communications which do not contain the name and address of the writer*, not necessarily for publication, if desired to be withheld. We do not undertake to answer any queries not specially connected with Natural History, in accordance with our acceptance of that term; nor can we answer queries which might be solved by the correspondent by an appeal to any elementary book on the subject. We are always prepared to accept queries of a critical nature, and to publish the replies, provided *some* of our readers, besides the querist, are likely to be interested in them. We cannot undertake to return rejected manuscripts unless sufficient stamps are enclosed to cover the return postage. Neither can we promise to refer to or return any manuscript after one month from the date of its receipt.

W. R. and M. W.—Artichoke galls.

H. H.—What "Black Fly"? What "Green Fly"? You must really be more explicit in your queries.

W. K.—In our volume for 1865, p. 180, you will find a reply to your query in the article entitled "The Diet of Worms." We have no doubt the fern is to be found at the place indicated, but *not* at this period of the year.

G. C.—A resupinate form of *Polyporus versicolor*.

W. M. H. inquires for the address of some dealer in Lepidoptera in Rotterdam, Hamburg, or Antwerp.

C. P. C.—The enclosure was *Cantharellus aurantiacus*, not edible. *Amanita rubescens* exhibits a dirty brick-red colour upon being bruised. In some cases very little redness is to be seen.

E. J. J.—Not very extraordinary that a fish should live half an hour out of water.

M. D.—Fungi will imbibe the flavour of such a volatile substance as turpentine if placed within its influence. No fungi are so good as when cooked immediately after being gathered.

J. G. O.—Your conjecture is very probable.

J. S. A.—The Humming-bird Hawk-moth has not been uncommon during the past two or three years.

W. E. S.—The fern is *Cystopteris fragilis*, common in North Wales and elsewhere.

G. B. (Bonsall.)—The moss is *Dicranella heteromalla*.—*R. B.*

J. C. D.—*Bryum capillare*, young.—*R. B.*

H. F. P.—Plant from Penryn is *Illecebrum verticillatum*.—*B.*

J. R. E.—Hawks and owls are fed on raw meat, mice, and small birds. Your book is above the second-hand price.

W. F. Howlett. — Your small beetle is apparently a recently disclosed and slightly undeveloped example of *Scymnus minimus*, Payk.; a species occasionally found near London, belonging to the *Coccinellidæ*.—*E. C. R.*

F. G. T.—The beetles in box No. 1 are *Hylesinus fraxini*, Fab., one of the *Xylophaga*, very common, and often injurious to ash-trees. For an account of its habits, see the *Entomologist's Monthly Magazine*, vol. v., p. 120. Those in box No. 2 are of two different genera, both belonging to the *Cioidæ*, and common in fungoid growth on old trees. The larger one is the abundant *Cis boleti*, Scop.; and the three smaller specimens are *Octolemnus glabriculus*, Gyll.,—the two lighter examples of them being very immature. Those in box No. 3 are all *Engis rufifrons*, Fab., one of the *Erotylidæ*, gregarious, and abundant in fungi on trees, especially on elms.—*E. C. R.*

A. R.—*Bombus muscorum*, male.—*C. W.*

W. H. D. forgets that we are "Gossips."

B. T.—One slide for a little of Cherryfield deposit.

E. C. — The larger species of your beetles is *Cis boleti*, Scop.; the smaller is *Octotemnus glabriculus*, Gyll. Both belong to the family *Cioidæ*, and are abundant in fungoid growth on old trees.—*E. C. R.*

T. J.—Drawing very rough, so that it is difficult to name your caterpillar therefrom. It is probably that of *Xylophasia rurea*, or *X. hepatica*.—*H. G. K.*

J. B. (High Crompton.)—No special provision is made in the bye-laws of the Quekett Microscopic Club for country or corresponding members. They are admitted as ordinary members for ten shillings per annum.

R. H. N. B.—Most probably a *Polycystin*.

G. T. P.—On pear leaves is a fungus, *Rœstelia cancellata*.

J. M.—We cannot insert communications received after the 15th of the month, at latest, until the succeeding number, when yours will be useless. We have given this notice *very* often without much effect.

W. B. C.—Several remedies are given in our volume for last year.

T. G. D.—Mr. W. R. Tate, Grove House, Hackney, is most likely to be able to inform you.

EXCHANGES.

Colias hyale and Sphinx ligustri in exchange for other species.—E. H. Walland, 19, Oakley Street, Chelsea.

Lepidoptera in exchange for minerals or fossils. — R. S. M., 27, Oakley Road, Islington.

Cornish and other Plants in exchange for local British or European plants.—Send lists to R. V. T., Withiel, Bodmin, Cornwall.

Oak Spangles.—For specimens send stamped and directed envelope to B. Taylor, 57, Lowther Street, Whitehaven.

Pupæ of Notodenta Ziczac, and Larvæ of Phragmatoria fuliginosa for pupæ of any of the Hawk-moths except *S. populi*.—Alfred Pickard, Wolsingham, Darlington.

Seeds of Eccremocarpus, Hair of Bat, and Wing-case of Brazil Diamond Beetle (unmounted), for a good mounted object.—J. Shelton, 52, High Street, Bedford.

Fossil Wood from Lough Neagh, Ireland. — Send stamped and directed envelope for sections, to John Butterworth, Mount Pleasant, High Crompton.

French and British Beetles to exchange for others.—E. G. Wheeler, 3, Bertie Terrace, Leamington.

Pupæ of Privet Hawk (*S. ligustri*) and Peppered Moth (*A. betularia*), for other British Lepidoptera.—C. R. Deward, 41, Copenhagen Street, Worcester.

Gorgonia anceps and other species (named). — Good slides offered for good injections.—W. Freeman, 2, Ravensborne Hill, Lewisham Road, Greenwich.

Dionæa muscipula (Venus's Fly-trap) in exchange for similar plants.—John Nilson, 4, Meadow View, Whitehaven.

BOOKS RECEIVED.

"Bristol Naturalists' Society, List of Officers, Members, and Books; and the Rules." Bristol, 1868.

"Proceedings of the Bristol Naturalists' Society." Vol. iii. No. 7, September, 1868. Bristol, 1868.

"The American Naturalist." Vol. ii., No. 7, September. No. 8, October. Salem, Mass.: Peabody Academy of Science.

"The American Entomologist." No. :, September, 1868. Studley & Co., St. Louis Mo., U.S.

"Popular Science Review," for October, 1868. London: R. Hardwicke.

"A Guide to the Study of Insects," by A. S. Packard, jun., M.D. Parts I. and II. Salem: Press of the Essex Institute, U.S.

"The Quarterly Magazine of the High Wycombe Natural History Society." Vol. ii., No. 2, October, 1868. Wycombe: W. Butler.

"Country Life." Vol. ii., No. 57, October 1st., 1 London: 10, Bolt Court.

"The Dental Register," edited by J. Taft and G. Watt. September, 1868. Cincinnati: Wrightson & Co.

"The Gardener's Magazine." Part XXXIV., October, 1868. London: E. W. Allen.

Communications Received.—B.—E. H. W.—W. B.—W. J. S.—F. P.—C. P. C.—E. I. H.—W. M. H.—E. M.—J. E. M.—G. C.—W. F. K.—P. H. G.—C. B. B.—P. T. P.—W. K.—H. H.—E. R.—W. W. S.—T. Q. C.—M. M. W.—J. B.—T. C. M.—W. G.—T. J.—H. F. P.—B. T.—R. V. T.—T. S.—E. B.—R. H.—J. E. D.—R. B.—A. C.—A. H. E.—A. M.—J. H.—J. B.—H. D.—B. T.—L. L.—W. H.—A. W.—B. G. G.—E. G. W.—T. D. R.—A. G.—J. B. B.—J. B.—H. C.—W. T. I.—E. W.—S. M.—W. M. H.—A. P.—J. S.—G. B.—J. R. E.—E. T. S.—A. B.—H. E. W.—W. H. D.—B. B. S.—F. G. T.—J. W.—R. T. M. A.—W. J.—C. R. D.—E. C.—W. F. T. W. W.—T. R.—G. S. P.—J. R.—R. H. N. B.—W. R. T.—A. G., Tisbury.—L. B. S.—G. G.—C. F.—F. J. D. H.—W. B. C.—R. G. J.—T. G. D.—J. M.—R. H.—W. R.—T. R.—G. T. P.—G. I.—C. F.

WHY?

It came about in this way. We—that is, I, and a writer well known to the readers of these pages — were rowing lazily about on the mill-pool at Mobberley, Cheshire, and I was thoroughly enjoying the delicious feeling of indolence which steals over one upon such occasions when the work is done by another, especially after a six hours' railway journey on a hot summer day. It was one of the glorious evenings of last August; the sky was all aglow with the rays of the setting sun, and we were both in a mood for conversation, which, not unnaturally, turned on the plants which fringed the water's edge. "*Why* is it," said I, "that this Willowherb is called 'Codlins-and-Cream'?" "Here," was the reply, "we call it 'Apple-pie'; and if you will wait a moment you will soon discover the reason." So we rowed on, pushing our way up a narrow stream, passing under over-hanging osiers on which the swallows had composed themselves for the night, and from which they hardly took the trouble to rouse themselves, and at length a thicket of *Epilobium hirsutum* revealed itself, not only to the sight but to the smell, leaving no doubt as to the meaning and appropriateness of the name above referred to. Long as I had known the Great Willowherb I had never noticed its peculiar smell; and thinking of my own want of observation I put to myself questions, sometimes answering them, sometimes leaving them unanswered, thinking how little one knew, and how much there was to know, and some of these questions, with others, which have since been brought before me, I now purpose to lay before the readers of SCIENCE-GOSSIP.

Why is it, thought I, as we made our way through great masses of water-lilies—yellow ones, relieved here and there by a patch of white—that one writer after another states that the flowers of water-lilies "sink beneath the water to sleep"? They do nothing of the kind; and *why* should those who write books, professedly for the instruction of the unlearned, continue to make statements which a small amount of observation would correct? And then I remembered that Sir J. E. Smith had made the above assertion, and, although it has been since corrected, one after another, recognising that great botanist as an infallible authority, has copied his remarks without taking the trouble to verify their accuracy; and the result is that one after another has stated what is positively incorrect. The idea of the water-lily sinking to sleep may be very romantic and poetical, but if we wish to retain it we must do so at the expense of fact.

Again, *why* is an entirely false account of the means by which the Bladderwort (*Utricularia vulgaris*) is reproduced allowed to appear in one book after another? We are told by more authors than one that the bladders on the leaves at a certain period fill with air, that the flower-stem is thus buoyed up to the surface, that the flowers are produced, and that "after the germination of the seed" the bladders "again fill with water, carrying down the seed to ripen and germinate in a suitable soil." This sounds very plausible; but like the sleep of the water-lilies, it has one drawback—as far as the seed goes it is incorrect. Anyone who will take some plants of Bladderwort in September from their place of growth, and put them in an aquarium, or other suitable vessel, may easily observe for himself what really *does* take place. The Bladderwort is one of those plants which, like the Bulbiferous Coralwort (*Cardamine bulbifera*) seldom, if ever, perfect seeds; its propagation is effected in another way. At the close of the season the leaves gradually decay, leaving nothing but the terminal buds, which are oblong and compact, of about the size of a pea; and it is from these buds that the next year's plants arise.

"The reason *why*" in both these cases, and in many more which might be cited, is, that people are content to accept as gospel any published statements without troubling to see for themselves whether "such things are." They are not even as praiseworthy as the hero of old, who "made the giants first, and *then* he killed them." They leave to others the trouble of making and killing the giants, and then they take to themselves the spoils without stopping to consider whether or no they be worth the having. Perhaps one of the largest of this kind of giant ever manufactured was the Upas-tree of Java. Its really deleterious properties, exaggerated in the first place by its original discoverers, were magnified to a startling extent: it destroyed all vegetable life for a distance of ten or twelve miles; birds flying over it were killed; no one dared to approach it: yet as specimens are now to be seen in our botanical gardens, we may form our own conclusions as to the truth of these astonishing statements. But perhaps some excuse may be made for writers on foreign plants, who cannot be expected to know from personal observation all that they state. Unfortunately, however, it is our own British plants that are treated worst of all in this respect. Had Job lived at the present day he would have expressed his wish regarding his enemy somewhat differently: not content with desiring that he might write "a book," he would have added "on wild flowers"; his revenge would then have been complete.

Perhaps some of my readers may now turn the tables on me, and say, *Why* do you harp upon so well-worn a string? We know that accurate observation is necessary; surely you need not bring that again before us? But I do so just because I think it *is* needed; and so long as books and articles are published in which this principle is overlooked and ignored, so long will it be necessary to draw attention to its importance. If people would only describe what they really *see*, there would be no need of romance to make their writings interesting; and a page of real observation is worth a volume of mere compilation.

Why is it that novelists and others, not content with distinguishing themselves in their proper province, must describe natural objects as they are *not?* When we are told that "the red berries of the wild convolvulus hung in long festoons upon the hedges," we know that the author refers to something which he really *saw*, although he attributes the berries to a wrong plant; but when we read of "the bindweed, azure-hued as the blue sky above us," decorating the hedges, we know that the imagination of the writer must have been drawn upon to a considerable extent. I once read a description of a *Pyrola*, in a novel of which I forget the name, which quite opened my eyes as to the character of that plant. Here again it may be said that we have no right to object to people writing what they please, that we cannot expect every one to be a botanist; but we *have* a right to demand, and we *can* expect that they should describe what they see, not what they imagine they have seen.

"*Why* the name of horse-chestnut should have been given to an object which the horse abominates as a food, we do not know." This we find in a recent number of a standard medical journal. Had the writer been acquainted, ever so slightly, with the names of plants, and their meanings, he would scarcely have connected the name "horse-chestnut" with the animal which supplies the first half of the word. The many words to which "horse" is affixed, in all of which its meaning is the same, would surely have explained it: *e. g.*, horse-godmother, horse-leech, horse-fly, horse-mint, horse-thyme, horse-knob, horse-radish, horse-mushroom. Just as the affix "dog" signifies something spurious or worthless, so horse conveys the idea of something large or coarse. Horse-chestnut, therefore, is simply a large or coarse chestnut; the superficial resemblance which its fruit bears to that of the sweet, or Spanish, chestnut having doubtless suggested the name. It is only fair, however, to state that some of the older writers refer to its use in eastern countries as a cure for "shortnesse of winde" in horses. Another origin of the name was given subsequently, in the journal before referred to, which is so ingenious that it seems a pity that it should not be correct. The writer says:—"The tree is truly designated the horse-chestnut, from the following simple fact, viz., that the bark of every twig of a year's growth, bears marks of resemblance to the hoof of the horse with the shoe and the impression of the nails. Every leaf that falls from the tree leaves a similar mark on the stem, so that there is no difficulty in finding it." The resemblance referred to is indeed very curious; it is not only left by the leaf upon the stem, but may be distinctly seen upon the leafstalk, where it joins the branch. Nevertheless, it seems scarcely likely that this should have been the cause of the name, which seems to have originated with the "nut," rather than with the tree itself.

And while I am upon the subject of names—a subject to which I hope to return at length in a future paper—I would just remark upon the confusion which seems to exist between the names Horse-tail and Marestail. The Horsetails are the various species of *Equisetum*, flowerless plants, occurring in fields and woods, on banks and heaths, in dry places and wet; the Marestail, on the contrary, is a flowering plant (*Hippuris vulgaris*), growing in water. The names had the same origin, from the superficial resemblance existing between the two; the *Hippuris*, from its producing seed, being called the "Female Horse-taile" by Gerarde and the old herbalists. "Modern botanists," says Dr.

Prior, "following Hudson, have shifted the hyphen and chosen to understand the name as 'Female-horse Tail,' or Marestail!" The two names are, therefore, now recognised as belonging to two different plants. *Why*, then, is it that not only do writers of no importance continually confuse the two, but even Dr. Hooker, in his admirable address lately delivered before the British Association at Norwich, speaks of the *Equisetaceæ* as containing but one recent genus, "that of the common Marestails of our river-banks and woods." This is the more misleading, as, although the *Hippuris* was once called Horsetail, we have no grounds for asserting that the *Equiseta* were ever known as Marestail; except to a lady whom I heard on one occasion dilating upon the Wood Horsetail (*E. sylvaticum*), barren and fertile plants of which were before her, who informed her companion that "*this* (the barren spike) was the Horsetail, and *that* (the fertile one) the marestail; *this* is the *male*, and *the other* the *female!*"

Why are "splitters" and "lumpers" antagonistic? Probably because the "splitters" accuse the "lumpers" of a tendency to generalize, to ignore slight differences, to accept things as they appear to be, without due investigation: because, too, a chief among them, while uniting many plants generally considered distinct, admits, as species, in the genus to which he has paid particular attention, two forms at least as nearly allied as many which he rejects. On the other hand, the "lumpers" accuse the "splitters" of raising slight and trivial differences, such as those caused by soil, situation, or other accidental circumstances, to too great importance; because, too, a chief among *them*, in his maturer age, has seen the necessity of withdrawing more than one "species," which, in his younger days, he laboured hard to establish. Both parties will probably in time discover what Tennyson calls "the falsehood of extremes," and acknowledge the truth of the old maxim, "in medio semper tutissimus ibis."

My last query is one which brings me back to Mobberley, for there it was forced upon me; and I hope some reader of Science-Gossip will be able to answer it. *Why* is the Tormentil (*Potentilla tormentilla*) separated from the Creeping Cinquefoil (*P. reptans*)? or, what are the specific differences between the two? To quote the words of the late lamented Artemus Ward, when he astonished the congregation by replying to the preacher's question, "Why was man made to mourn?"—"I give it up."

B.

Hawthorn Blossom in October.—During a stroll between Finchley and Hornsey last week, I observed a hawthorn covered with blossom, while, mingled with its snowy burden, were the red haws of the previous May.—*E. West.*

VARIATION IN THE HAWTHORN.

Among the many questions now violently agitating the scientific world, there is perhaps none more widely discussed by the world at large, and none upon which it is less capable of passing judgment, than the "origin of species." The subject is one that requires not only an extensive knowledge of natural history and geology, but also a certain freedom from prejudice, a willingness to abide by the evidence of facts, and a firm reliance upon the results of just reasoning founded upon such evidence, whatever, and how startling soever, the conclusions arrived at may seem. Negative evidence in this as in other subjects is untrustworthy and of little or no value. The opponents of Darwin's theory frequently assert that by natural selection and variation no single species of animal or plant has ever been known to have been produced in historical times. Admitting this assertion to be correct, no inference of any value can be deduced from it. For we would ask, are the descriptions of organized nature so numerous and exact that we know every plant and animal to be to-day in structure and appearance identical with what it was 2,000 or 3,000 years ago? Had the study of natural history acquired such wonderful perfection at so remote a period as to warrant this conclusion? I trow not. The assertion is puerile and ridiculous.

There is, however, in almost every natural order of plants some genera that certainly appear to speak in favour of such a formation of species by variation. How else are we to interpret the confusion among botanists of eminence as to the extent of such genera as the Rose, the Willow, the Bramble, the Violet, the Ranunculus, and others? In each of these genera there are a number of forms, upon the value of which the very best naturalists disagree; some ranking them as true species, and others as mere varieties. The very fact, however, of their being thus ranked by skilful botanists as species clearly shows that they are at least more or less distinct and persistent varieties. But varieties, once become persistent, can only be regarded as species; for wherein do they differ? Certain great groups of plants, including the above, are at present extremely active in originating new varieties. We are strongly impelled, when we review our existing plants, and observe how intricate and close is their alliance,—we are strongly impelled to regard these variable plants of the present day as the common parents of future genera and species. A more minute and accurate study of supposed species, such as is at present being carried on by M. Jordan at the head of continental botanists, can scarcely fail to throw much light upon the power of plants to vary, and indirectly upon the "origin of species by variation and natural selection." The formation of varieties, then, though perhaps as yet proving nothing, points,

with no unmeaning finger, along the track we have to look for the unfolding of that mysterious connection that obtains between the present and the past forms of animal and vegetable life.

Many common plants, generally regarded as well-defined species, are found on closer examination and more careful study to be little less than small genera, or at least groups of varieties or races. In the face of such facts as these, what certainty have we that many plants, now justly regarded as species because found to be permanent forms, are not mere varieties, from closely allied species, of some centuries' standing? There seems nothing extravagant in this notion; yet were a few cases of the kind clearly proved, they would speak volumes. Such proof, however, is almost impossible from the fact that varieties have not heretofore been clearly marked out and defined. Future naturalists will have more data to work upon, and may thus be able to prove the origin of species by *variation* experimentally.

As a case of this loose definition, we will instance the common Hawthorn (*Crategus oxyacantha*).

Mr. Hobkirk, in the year 1866, drew the attention of working botanists to this plant in the pages of the *Naturalist*. After a considerable amount of laborious research, and many examinations of fresh and dried specimens, he arrived at the conclusion that we had in England at least four well-defined varieties. These he described under the names of *Crategus oxyacanthoides*, *C. monogyna*, *C. kyrtostyla*, and *C. laciniata*. During the summers of 1867 and 1868 I have myself given much time and attention to this plant. I find three of the forms well marked and abundant in this neighbourhood. I am not so clear about the fourth, *C. laciniata*, though I have found many specimens that I believe to be referable to it, but accompanied by many intermediate forms.

Fig. 248.—Leaf of *Crategus oxyacanthoides*.

I will attempt to describe them for the benefit of those whose attention may not already have been directed to them. The descriptions have in every case been drawn up from the examination of fresh specimens, many hundreds of which were passed in review for that purpose.

1. *Crategus oxyacanthoides.*—Styles 2-3 (rarely in a few flowers 1 only). *Calyx* and *peduncle* quite glabrous. Calyx-teeth short, triangular, spreading (never reflexed either before or after flowering), united by a small membranous border. (As seen from below, the calyx is regularly pentagonal, the angles very slightly projecting—fig. 249.) *Leaves* rather small roundish, or obovate; three or five not deeply cut lobes, generally copiously serrate; nerves distinctly converging (fig. 248). *Petioles* pubescent, also nerves of leaves and midrib, below, slightly hairy above. The base of the leaf and of each lobe generally sub-ciliate.

Fig. 250.

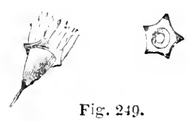


Fig. 249.

Fig. 251.

The mere inspection of the foliage alone is mostly sufficient to determine this species. It has a very different appearance from the other varieties. The leaves are smaller, much less deeply cut, of a lighter green, and not so highly polished.

2. *Crategus monogyna.*—*Style* 1. *Calyx* and *germen* glabrous; *calyx-teeth* oblong, reflexed, generally shorter than in *Kyrtostyla*. *Leaves* glabrous on both sides, except base and principal veins, which are sometimes sub-ciliate; three or five somewhat deeply cut lobes.

3. *Crategus kyrtostyla.*—*Style* mostly 1 (sometimes 2), generally more or less incurved. *Calyx*, *germen*, and *extremity of peduncle* covered with soft silky hairs. *Calyx-teeth* lanceolate obtuse, as long, or nearly as long, as germen, upon which they are closely reflexed (fig. 250). *Leaves* rather large, deeply three- or five-lobed; summit of lobes more or less serrate; petioles, base, and inner side of lobes of leaf sub-ciliate; glabrous on both sides, except midrib and principal veins, which are very slightly hairy (fig. 252, leaf of *C. kyrtostyla*).

4. *Crategus laciniata.*—*Style* 1, erect. *Calyx*, *germen*, and *peduncle* glabrous. *Calyx-teeth* lanceoate, acute. *Leaves* pinnate, lobes very deeply cut, first generally to midrib, and others nearly so; large, dark shining green above, strongly inclined to grey beneath (fig. 253, leaf of *C. laciniata*).

Between two of these forms, *C. kyrtostyla* and *C. monogyna*, I have noticed a considerable number of intermediate forms, but the varieties themselves are well marked and easily distinguished. *C. oxyacanthoides*, as will at once appear from the descriptions

and figures, differs widely and in a number of points from either, and seems very persistent. I noticed but one plant that appeared to lie between this and the other varieties. In that specimen the calyx and germen were hairy, the calyx-teeth reflexed (fig. 251),

Fig. 252. Leaf of *Cratægus Krystostyla.*

the style, when but one, incurved, and the nerves diverging—agreeing in these points with *C. kyrtostyla.* It approached *C. oxycanthoides* in having (mostly) 2 styles, and in the general shape of the leaf, which was, however, larger and of a darker green. This form would appear to have considerable claims to be considered specifically distinct, more especially as there is a biological difference of some importance between it and the others; viz., a difference in the time of flowering. It is said by several botanists to flower fourteen days earlier than the other forms. My own

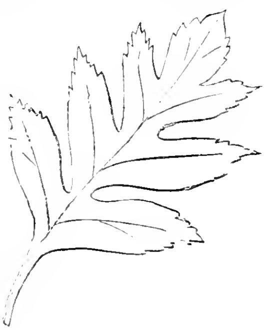


Fig. 253. Leaf of *Cratægus laciniata.*

experience shows a difference of at least a week. As was noticed by Mr. Boswell Syme, "the margins (of the leaves) are slightly convex from the base to the apex of the first lobe" in *C. oxyacanthoides*, while in the other forms they are "concave or straight from the base to the apex of the first lobe." This I find to be almost invariably the case. (Compare fig. 248 with figs. 252 and 253.)

How are we to regard these widely differing forms? As specifically distinct, or as mere varieties? Mr. Hobkirk and continental botanists seem inclined to look upon them as distinct species. However this question may be decided, there can, I think, be no doubt that they are the result of variation, modified by atavism, the variation resulting from unknown causes acting slowly for a great length of time. If secondary causes, then, are competent to produce varieties so widely differing from each other as to render it doubtful whether they are not specifically distinct, it is no violation of reason, and analogy would bear out the result, to conclude that species, and even genera, have been produced in the same way. Some years ago it was generally believed that "cataclysmal irregularity" was the method in which geological phenomena had been wrought; *now*, we have reason to believe, and with tolerable certainty, that the operations of nature have ever been characterized by the regularity with which she performs her labours at the present day. So with regard to the introduction and extinction of organized beings, it has been customary to regard them as sudden, complete, and independent of natural laws; whereas, to use the words of an opponent of the theory, "in the world around us we see nothing but the activities of second causes; and though reason has yet failed to detect the mode in which new life-forms are produced, faith may surely be allowed to believe in their *genetic connection* [the Italics are mine] by some *continuously operating law*." I find myself totally unable to understand what is here meant by a *genetic connection produced by a continuously operating law*, unless it alludes to some such theory as the gradual evolution of species from pre-existing life-forms. If we believe in a separate and independent creation for each species, there cannot be supposed to be any genetic connection between them. The fact of the opponents of the theory finding themselves compelled to use its language, if not strong presumptive evidence in its favour, is at least a proof of its utility in rendering intelligible the highly complex yet harmonious system of organic nature.

John Hepworth.

St. Mary's Vale, Chatham.

NOBERT'S TEST-PLATE.

THIS "marvel of art" is well described in a paper by Mr. Charles Stodder in the "American Naturalist" for April, 1868. It consists of a series of groups of parallel lines ruled on glass, each succeeding group being finer than the preceding one. Different plates have a different number of groups, ruled to different scales. One of the plates has thirty groups of these parallel lines, in the coarsest of which the lines are the one thousandth part of a Paris line apart, and in the finest group the lines are only one eight-thousandth part apart. Each group or band occupies about the two thousandth part of an English inch in width; and the whole thirty groups occupy a space of little more than one fiftieth of an inch. It is a difficult matter for the mind to appreciate such minute divisions of space; but in order to form some idea of their minuteness we are remined that "the average diameter of a human hair is about the one thousandth part of an

inch, and that in a space only one half as great in the coarsest band of the Nobert plate there are seven lines, and in the finest band there are thirty-five lines." Another of these plates is ruled with nineteen bands of lines, in the first of which the lines are one thousandth of a Paris line apart, while in the finest or nineteenth band the lines are only the ten thousandth part of a Paris line apart. It may well be asked whether human art has ever made an instrument capable of rendering visible lines in such close contact with each other. The problem is exactly the parallel of that of the power of the telescope of separating double stars.

The lines are ruled on the under surface of a thin glass cover, which is cemented at the edges with Canada balsam to a glass slide, on which the fractions of a Paris line corresponding to the principal lines are written with a diamond. For the purpose of testing the resolving power of the microscope these lines are admitted to be the best known tests, not only in consequence of their exceeding fineness, but also because they are ruled to a known scale. Up to the present time the finer bands of lines in these plates have never been resolved, and have therefore never been seen even by the maker of them, though there can be no reasonable doubt that the lines do exist. Mr. Stodder professes to have seen the nineteenth band satisfactorily, in which the lines are one ten thousandth of a Paris line or one hundred and twelve thousandth of an inch apart. But a later writer in the *Quarterly Journal of Microscopical Science* says, that his own observations have convinced him that Mr. Stodder saw spurious and not real lines. For in the finer groups of lines it appears that when the resolving power of the objective approaches its limit spectral lines are seen; that is, lines composed of two or more real lines, and the true lines cannot be seen with any degree of certainty. The difficulty of counting the lines is of course much greater than that of merely seeing them, just as it would be extremely difficult to count the pickets in a fence at the distance of a hundred or an hundred and fifty yards, though the pickets themselves may be distinctly visible. In the microscope it is true that the micrometer is an aid in counting the lines; but in counting lines of such exquisite fineness either the micrometer or the stage must be moved, and it is almost impossible to construct an apparatus that can be moved at once the hundred thousandth part of an inch and no more; while any change necessitates a slight change of focal adjustment, and then it is extremely difficult to fix the exact line last counted. Colonel Woodward has described a method by which the Nobert's lines may be counted without photographing them: "We set up the microscope as though to take a photograph, remove the eye-piece, receive the image on a piece of plate-glass and view it with a focusing glass, on the field-lens of which a black point is remarked. As the focusing glass is moved on the plate from side to side, the black point is moved from line to line. The lines may thus be counted with as much ease and precision as though they were large enough to be touched by the finger."

Still Colonel Woodward does not seem to have got beyond the resolution of the fifteenth band of the nineteenth band plate, and which corresponds in fineness with the last band of the thirty band plate, in which the lines are the eight thousandth part of a Paris line apart, or the ninety thousandth part of an inch. This band of lines is somewhat finer than the closest lines upon the valves of Pleurosigma as given in Dr. Carpenter's work. His table, taken from Smith's monograph on the Diatomaceæ, gives the average distances of the lineation of Navicula rhomboides and Navicula sigmoidea at the eighty-five thousandth part of an inch. So that the hundred thousandth part of an inch seems to be quite the limit of our present microscopic powers.

R. H. N. B.

SURREY BLACKBERRIES.

While spending a few days in the neighbourhood of Ockham, Surrey, in the absence of anything else of particular notice in the natural vegetation of the district, I was led, more by the abundance of the fruit than anything else, to closely observe the different varieties of the genus *Rubus*. The prevailing form in this part of the country is that known as *Rubus discolor*, a very common Surrey plant, and very distinct, with a dark-green upper surface to the leaves, and a white hairy under surface, hence the two distinct colours, which give it its specific name. This may be further distinguished by its black fruit shining with a metallic lustre, and the regular size and rounded form of each individual drupel, the fruit of the typical form of this plant is hard and not very good in flavour; but there are several varieties of it seemingly from crossing with *Rubus corylifolia*, which is a decided improvement as far as flavour is concerned. These varieties are recognized by the foliage differing in a greater or lesser degree from the typical form. The former has the leaves of the *carpinifolia* sections of the genus, while the varieties have a broader character and a fuller margin, bringing them nearer to the *corylifolia* section; these seem to be heavier croppers, and if ever blackberries become cultivated, these varieties would be the most useful on account of the small space they occupy. Two other varieties occurred sparingly, which I do not remember having noticed previously, they were tall growing kinds, the most striking character being the very large size of their fruit, the drupels, in both varieties, being twice as large as the sorts previously observed, and both of them also agreed in passing rapidly from a pale pink to black; but the difference in the

stem and leaves was most distinct, one having a round stem and no stout prickles, but numerous weak ones, intermixed with glandular hairs; the leaves were soft, thin, and rather downy on both sides, very large with the venation weak, and scarcely prominent; the leaflets mostly in threes, rarely five. The other variety had the stem angular, with numerous stout prickles, though not crowded with them, not intermixed with hairs, but the stem smooth and shining; the leaves of this were stout and coriaceous, the leaflets in fives, strongly and prominently veined, and cuspidate at the apex, while the former was merely acuminate. These two varieties appear to be a mixture of *Rubus suberectus*, of Anderson, with *Rubus corylifolia*, and *Rubus discolor*. It is only fair, perhaps, to state that *Rubus corylifolia* is not a very common plant in this neighbourhood.

Occasionally typical forms of *Rubus corylifolia* were met with, but this was generally associated with another which presented a slight divergence. A description of the two forms will perhaps enable your readers to distinguish them from each other. To begin with the fruit, there is no difference for the eye to distinguish; they are both large, with the drupels not perfectly round, owing to compression through crowding; there is also a want of lustre in them, compared with *Rubus discolor* and its varieties; they are both very juicy compared with any other kind, but in flavour the resemblance ceases, the one which I shall describe as the typical form being by far the richest. Those who know the broad hazel-like leaflets of *Rubus corylifolia*, also know that they have a silvery looking under-surface, distinguished as hoary; another character, perhaps not so well known, is that the receptacle of the fluid is in the form of a truncated cone. The variety of this form differs from its type, in the under-surface of the leaves being silky instead of hoary, and in the receptacle of the fruit being more depressed, representing a broad ring or band, more than a cone. In conclusion, I think it would add to the value of descriptions of this intricate group of plants, if descriptions of the receptacle were embodied among the many other points relied on. This presents itself with greater force when we consider the two extreme conditions of that organ, as represented in the raspberry *Rubus idæus*, where it is a long spongy cone, and *Rubus discolor* where it is reduced to a small narrow ring.

Those who are fond of this fruit, should gather them at midday, when the sun has been full on them for some hours, and eat them *hot*.

Alfred Grugeon.

Osmunda regalis is called Bog Onion in West Cumberland, and considered a specific for rickets in children.—*J. Bowman.*

FURZE MITES.

I HAVE a few observations to add to the natural history of "Furze Mites." The eggs are laid between a thorn or prickle and the main stem; they are thus in a fork, and not easily blown or rubbed away. They are either slightly attached to the web, or gummed to a hair of gorse. They are soft, like slug's eggs, and at first almost colourless, then lilac, pink, blotchy red, and finally deep ruddy brown. Their diameter is, as nearly as possible, $\frac{6}{1000}$ of an inch. On the seventh or tenth day after being laid, they hatch; and I will now give the particulars of a few which I watched for some time. They hatched on the 13th of August, and crept without much deliberation on to a bit of fresh gorse to which the dry prickle had been pinned. They were six-legged, and of a light pink colour. On the 15th they were all green, and had made a very fair little web; a necessary preliminary to the grand business soon coming off. On the morning of the 17th they had all changed their skins, and were seen to be eight-legged and pink again; their colour, however, soon changed to a dark dull green, a sign of a rapid change of skin, which, indeed, took place on the 20th.

Reddish at first, they were green by the 23rd, and on the 29th changed again, assuming the orthodox dark red colour, which they retain now till death. On the 30th, however, careful scrutiny revealed a few individuals, who had not grown as rapidly as the rest, and were paler, almost green. On the 30th also a few eggs were noticed; their number soon increased, and by the second of September a great many were laid. At this time there were five or six mites with the real bright green abdomen, slightly turned up at the end; so I consider my colony to have accomplished one full generation, and here its history ends. About the green specimens: they are not young ones, for these have a different sort of green, and accompanied by a fat abdomen and shorter legs; and it will have been seen that the eggs appeared at the same time as the green specimens, so *I* think they must be males.

When the adult females are kept on dry gorse for a day or so, as when the water in a bottle runs short, they become more brightly crimson-scarlet, and congregate in layers six to ten deep on the ends of the prickles, evidently wishing to be blown or knocked on to (imaginary) adjacent bushes. When a fresh meal is supplied they become much darker, almost brown. The spinnerets I could never see properly; there is certainly a decided knob on the under-side of the extremity of the abdomen, but I never saw silk issuing from it. On the bodies were sinuous lines, like those on the human finger-tip; but these I never saw on the legs. When their skin is ready to come off it appears slightly iridescent, and,

on the legs, white and dry. The abdomen is tense and smooth; they take up a fixed position on the web, with two pairs of legs stretched out in front, and two under the body behind. Soon the skin of the abdomen splits transversely, and the mite gradually withdraws his head and forelegs. Crawling away, he leaves a dry white cup, the skin which formerly covered the posterior part of the abdomen. On the web there are generally lady-birds (*C. bipunctata*) and a very small beetle. The eggs of these are confusing at first. Their larvæ fully appreciate the convenience of the web, and wriggle happily along it. I shall be happy to send specimens of the mites to any one desirous of observing their habits.

Clifton College. W. F. HOWLETT.

REPTILES IN CONFINEMENT.

TOADS often make mistakes similar to those I described as peculiar to the green tree-frog in the September number of SCIENCE-GOSSIP—to which article the name H. Alliott was printed in mistake for my own. I have no doubt it arose from the illegibility of my signature; and I hope this will be a warning to other correspondents (as it will be to myself) who are in the habit of indulging in illegible signatures.

A toad I had in the summer of 1865, often made a mistake which any evil-disposed or anti-toadian person would have called cannibalism. His peculiarity was that of snapping up any juvenile toad that happened to crawl past him; he, however, soon spat them out, the poisonous warts on their backs being, I suppose, disagreeable to our friend's palate. Though I was very fond of "toady" and revere his memory much, I must own, that if they had been young frogs instead of toads, I believe he would have swallowed them.

I once had a common frog which was very fond of climbing up and staying among the branches placed in the case for the tree-frogs, and, to quote "C. A." once more, he often appeared of a "greenish tint." His favourite food consisted of large earthworms, the size of which did not seem to trouble him in the least.

Some few years ago I had a salamander, which after a few months managed to make his escape. We soon gave up all hope of ever seeing "Sally" again. However, two years after it made its appearance in our back kitchen, looking as plump as ever. I ascertained from an examination of its excrement that it had subsisted on blackbeetles during its freedom.

When the Salamander has arrived at its perfect state, it, like our common newt, prefers to spend most of its time (the breeding season of course excepted) on *terra firma*. Anybody who has walked up St. Martin's Lane during the summer season and seen how the poor creatures exhibited in the aquarium shop-windows struggle to get out of the water, cannot fail to see that they would prefer land to water.

I have at the present time a salamander which I keep in a case, 3 feet by 1½ feet, at one end of which I have formed, with cement, a small pool, the rest of the bottom of the cage being covered with living turf, on which the Salamander passes most of his time, only now and then, of an evening, going into the water.

I feed my pet with the common garden spider, of which it will eat two or three at a meal. The Salamander catches its food with its tongue, in the same manner as the toad, and while after its prey, looks rather animated.

When "Sally" sees a spider or other insect at some little distance, it cautiously advances within an inch or more of it, and then makes a short run towards the hapless insect, which it quickly captures with its tongue.

On one occasion one of the spiders placed in the Salamander's cage for food, crawled upon its back and bit it on the nape of its neck, when, from each of the warts down its back, oozed a drop of the creamy matter common to some reptiles. I can always obtain some of this secretion—though in a much smaller quantity—by irritating the Salamander's back with a needle.

The Salamander also will often make the mistake which seems so common to some of the Reptilia—I refer to the habit of striking at any moving object whether animate or otherwise.

Union Grove, Clapham. H. H. MOTT.

AUTUMNAL TREASURES.

Ere in the Northern gale
The Summer tresses of the trees are gone,
The woods of Autumn all around our vale
Have put their glory on.

WHERE are the flowers gone to—the bright and beautiful blossoms that made our woods and fields so glorious a few short months ago? Nearly all of them are taking their winter sleep. The young May Violet has finished her season of sweetness; the wild Amenone, the first flower of spring, is at last under the fallen leaves; the delicious Sweet-briar, having perfumed our lanes during the warm days of summer, is *now* clothed in the brilliant garb of winter, its orange-red berries being nearly as attractive to the eye as its pink bloom was in June or July; but if the most charming of our spring and summer floral guests have departed from our sight, we have painted leaves and many coloured berries to compensate us for their loss, and there are still a few bright flowers left, more welcome to us, perhaps, from their very scarceness than all the varied

blossoms of the past year. To a portion of these autumnal treasures, the contents of a small basket which I filled yesterday in a solitary ramble, I intend to devote this sheet of paper—so let me begin to describe my bouquet.

I will place this bundle of berries in the centre of my vase: it will keep off evil spirits; at least my Welsh nurse taught me to believe that the wood of the Mountain Ash possessed a charm against witches and "the little people," as she called the fairy folk, who made the green rings in our meadow, where I always found the finest mushrooms; but I kept most carefully outside the charmed circle when gathering them, lest I should be "carried off to dance at their revels for a thousand years, and only wake up at the expiration of that time to find my dear mamma, Nurse Bridget, and all laid," where they now, alas! rest, "in the cold grave."

Next to the Ash-berries I will put a ring of Colchicum blossoms; they look very lovely; their pale, delicate purple colour contrasts well with the peculiar hue of the fruit. What a singular plant the Colchicum or Meadow-saffron is: its bloom appears in autumn *before* the leaves; they do not peep forth till the following spring, and proceed, as do the flowers, direct from the cormus. We get in the Coltsfoot flowers before foliage. You know of course that the blossoms come out early in the spring, and the leaves the following summer; but the Colchicum flowers die off without giving any signs of either fruit or foliage. Then, next spring, both seeds and leaves come forth together; the germen develope under ground in the bulb, and the fruit rises on a short peduncle, ripens about June, and perishes before the fresh blossom appears.

There are several poetical fictions respecting the Colchicum, and it is supposed to have been a favourite plant of that old enchantress, Medea. She was born at Colchis, and as the Meadow-saffron was originally brought from Natoli, it is very probable she was well versed in its deadly properties. In proper hands, and when administered according to the directions of the duly qualified medical man, Colchicum is often a great boon to suffering humanity, but many fatal instances are on record of the mischief done with it in domestic practice.

Although mother nature has not dressed the Colchicum blossom with the garb of leaves, I must place a little green next to it in my nosegay; and here is the Eye-bright close at hand.

> Famed Euphrasy may not be left unsung,
> That gives dim eyes to wander leagues along.

What a lovely little plant it is, with its elegant pencilled flowers, and small, light-green, smooth, deeply toothed leaves. Its yellow eye is said to have suggested the name in Latin, *Euphrasia*, being derived from the Greek of "joy" or "gladness;" but some botanical writers affirm that the appellation was given it in consequence of its efficacy in eye diseases. Milton tells us it was used by Michael, enjoined with rue, to remove the film which the "false fruit" had bred in our first father's "visual nerve." The grand old gardener's domestic medicines were all doubtless furnished by mother earth. Now comes a small spray or two of the Golden-rod, the *Goldruthe* of Germany, where many persons yet extol its virtues, as much as quaint old Gerade did when he cured "Master Cartwright, a gentle man of Grayes Inne" of a wound in the lungs by an outward application thereof; and here let me introduce a rare bit of Herb-Robert, *Geranium Robertianum*, one of our native Geraniums. It blooms from April up to the end of October, and I found such a sweet plant of it on an old wall in the course of my walk, that it brightened the whole scene with its cheerful flowers, and forcibly reminded me of those lines:

> Oh! emblem of a steadfast mind,
> Which, through the varying scenes of life,
> By genuine piety refined,
> Holds on its way 'midst storms and strife.

I cannot at this moment remember who they are written by, but I know they are addressed to the flower in question.

One more branch, and my vase and my paper will be filled. I should by rights have given the Oak the first place. The Oak chaplets of the Greeks and Romans, the Oak trees of the forest of Dodona, the monarch Oaks of Druidical renown, all demand that due honour be accorded to the *Quercus Robur*. Well, poets and novel writers, political economists and philosophers, have done and said their utmost in its praise, and little remains for me to add. Acorns are now as valuable as they were when *panage* was deemed a right, and constituted the dowry of the daughters of a Saxon King, but our swine keepers seem ignorant of the fact. Vast numbers are wasted. I believe boars feed on them yet, and so would pigs if they were allowed to.

How pretty the Oak-apples are: those galls produced on the young branches by the puncture of an insect. I have made a necklet of some intermixed with gilt beads. They really look, now in this age of chains and chaplets, very novel; and I intend to try to polish or varnish a few rows, for I think that if they could be made to look bright, like the fruit of the Horse-chesnut, it would immensely improve their appearance in the matter of decoration.

Helen E. Watney.

Protection to Birds.—An association to protect birds on British coasts during breeding season has been formed in Yorkshire. Its aim is to secure an Act of Parliament for that purpose. Support is invited from all naturalists. Address the Secretaries, the Rev. F. Barnes, M.A., Bridlington Rectory, or T. Harland, Esq., Solicitor, Bridlington Quay.

THE SLUG PARASITE.

Philodromus Limacum.

OUR worthy grandmothers, intent upon training us up reverently in the paths of faith and virtue, endeavoured to force upon our infant minds their own unquestioning belief that the unclean vermin which may not even be alluded to in polite society were created by Providence solely as "a visitation" upon wicked and dirty vagabonds. Even in this present year of grace there are grannies (of both sexes) who religiously maintain that the recent cattle plague was "sent as a judgment" upon the drovers and butcher-boys for using bad language and sharp-pointed sticks to quicken the paces of the *tardi boves* consigned to their tender mercies. Even if the mission of the irritating legions was restricted to tramps and beggar-wenches, I fear that we could not accept this philosophy as final.

Our eyes declare to us that there is scarce a living thing, great or small, that is not pestered with "hangers-on," harder to shake off than a poor relation or a pious lady in quest of a subscription. It is not only Lazarus on his dunghill, or the poor Cockney at his cheap watering-place, who is almost eaten up alive; the whole creation scratches, or at any rate itches and would like to scratch, but the fingers and claws necessary for the due performance of that vulgar operation do not happen to be universally distributed. Probably there is not an animal (using the term in its widest sense) that enjoys perfect immunity; the bullet-proof rhinoceros is worried by a tick, and the great whale is often so completely covered with suckers, barnacles, and lice that his skin is invisible, and he bellows like a great overgrown calf, while he rubs his blubbery sides against the rocks. But it is not only the giants that have toll levied on their vital juices:

> The little fleas that do so tease
> Have smaller fleas that bite 'em,
> And these again have lesser fleas,
> And so *ad infinitum*.

Most of us I dare say are familiar with a small member of the class Arachnida (*Gamasus coleoptratorum*) which infests the beetle, and is so large and so like the insect it feeds upon that it is sometimes popularly mistaken for its lawful progeny, only wanting a little time to change colour and grow to the size of its reputed parent.

But here is a still humbler creeping thing, not generally pleasant to contemplate,—indeed it almost turns the stomach of Mrs. Grundy; here is a common slug, *Limax cinereus* (*vel maximus, vel variegatus, vel maculalus*, according to your choice: the first is the name affixed to him by "Forbes and Hanley.") I caught him only yesterday afternoon as he sallied forth from a cool damp drainpipe to make a raid on my melons—my very choicest musk-melons, whose parents grew in a bed of rich black volcanic earth at the foot of Fusi-Yama. Angrily shovelling him up on a broken pane of glass from the hot-bed, I was about to consign him a *bonne bouche* to the ducks, when I perceived a dozen or so of little yellow mites racing about with extraordinary activity all over his slimy body; and, thinking them worth an hour's study, I disappointed the old mallard, whose tail was already in a wiggle-waggle of expectation, and deposited my slippery customer with the many aliases on a plate under a bell-glass in my sanctum sanctorum.

Let us look at him for a minute as he glides across the dome, presenting his ventral aspect to us. He is stretched out to his full length, nearly five inches, and is travelling at top speed; we cannot say that he is putting his best leg foremost, for he is guiltless of legs, but he is literally "pulling foot" as hard as he can, and his foot is indeed a wondrous contrivance; the strong hot glare of the sun, from which he is so anxious to escape, shines through it, rendering it almost transparent, so that we can see the play of the thousand muscular bands with the naked eye. At first we are almost tempted to fancy that we see a broad canal in the mesian line of the sole, containing a greenish fluid passing through a series of valves and producing an undulating gaining motion, and that progression is effected by this hydro-dynamical apparatus. A novice might be excused for dreaming that he was witnessing the blood flowing in rhythmic tide from the tail to the head; he sees no fluid in motion, but incessant muscular contractions which present to his eyes a miniature of the impression produced upon them by the rolling billows of a green cornfield when a brisk breeze is sweeping over it.

Professor Owen, in one of his lectures on the mollusca, says, "The cutaneous muscular layer consists of oblique, longitudinal, and transverse fibres, intimately united with the corium. Upon the ventral surface it becomes very thick and forms a long disc called 'the foot.' The fibres of this part contract successively so as to form wrinkles or transverse waves, following each other from behind forwards, whereby the disc glides over solid bodies or the surface of the water."

Here are at least a dozen of these φιλόδρομοι disporting themselves on Limax's speckled sides; there they go for a short preliminary canter, and now they dash off for a long heat. Réaumur was of opinion that the viscid secretion destroyed these parasites, but Nature never made such a blunder as to ordain for one of her creatures a habitat that must be fatal to it, or to neglect to adapt its physical conformation to the peculiar conditions, no matter how strange, under which it was designed to exist. Lamark states most positively that he is convinced that these acari are strictly parasites, attached to the slug family, and are not mere casual

visitors that have wandered from other pastures. Watch them: they don't mind the exudation one bit, but run over and through it with perfect freedom, without becoming entangled in the glairy fluid—"the viscosity"—which statuaries, medallists, and china-menders mix with shell-lime and albumen to form their strongest cement. Why, one of these jockies who was dabbed into a drop of Mr. Baker's best balsam, with the feather-end of a pen, to keep him still in the field of our binocular, has galloped right out of it and bolted clean off the course! They will run over the surface of water; if immersed in a drop of spirit placed on the slide, they become insensible and remain still, but they die in a couple of minutes.

What is the good of them? Where do they come from? Why are they never found on anything but the slug and the snail in France? why on the slug only in England? and why are they never found on either "north of Tweed," where it is said that other acari are a trifle too plentiful? I know not. Who knows how the *aquatic epizoa*, consigned to the wild waves and rushing streams, reach with unerring constancy the precise species to which Nature's Lawgiver has assigned them? How is it that the *Achtheres* of the perch and the *Tracheliastes* of the chub, hatched and living in the same pebbly pool, never interchange? And how is it that *Lernæopoda* and *Nicothöe*, born in tempestuous seas, attain unfailingly the living "fleshpots" for which alone they are adapted?

Our swift acari are said to be more numerous in dry than in wet seasons, and to take more out-door exercise on the slug's back when he is sick and sorry than when the limacine interests are flourishing. Apparently the foul-feeders, the gutter-hunters, and area-sneaks, *L. cinereus* and *L. flavus*, are more troubled with "company" than other species.

Look how they pop in and out of that large orifice on the right side of the back—the common vestibule not only of the pulmonary air-sac, but of other organs! Old Sinbad cares little for the liberties they are taking: he just shows that he is aware of their tricks, by giving a fidgetty twitch with the marginal ring. His sensibility is of low degree. Baron Férussac, speaking on this subject, says, "I have seen these terrestrial gasteropods allow their skins to be eaten by others, and, in spite of large wounds thus produced, show no signs of pain."

The slugs are not strict vegetarians, like the snails: the larger species are decidedly carnivorous on occasions, and I regret to record a bad case of downright cannibalism perpetrated by my melon-stealer, who devoured, in the dark hours of the night, the sole companion of his captivity, an ash-grey "milk slug," *L. agrestis* (the devastator of the farmer's root crops), nearly two inches long, leaving nothing of him but the spoils of a Dahomeau warrior, his head and shield. I happened afterwards to put under the same glass a common garden beetle *Carabus nemoralis*, of a family hitherto considered well-behaved, though somewhat malodorous, who, the moment he saw the gorged glutton, rushed at him with the ferocity of a wild cat, and drove his gaping mandibles into him, making deep indentations with his head; but in vain; the soft integument yielded before his butting, and slipped out of the grip of his ugly "nippers," and he could not get a hold for a bite except on the keel-like ridge, *the carina*, on sluggie's back, from which he tugged and tore out two or three big mouthfuls, without in any way discomposing the proprietor, who went on browsing, in a serene and unconcerned manner, on a succulent cabbage-leaf.

Where do the acari get to after entering the antechamber we watched them into? Some say they enter the respiratory cavity and draw their nourishment from the juices of its vascular walls; others declare that they inhabit the intestinal canal, and, only visiting daylight, much against their will, when forced out with the excreta, watch anxiously for a favourable opportunity to reascend; suffice it to say that competent observers have found them in abundance in *both* of these locations.

They differ materially, as we might expect, from the *Gamasi* of the beetles: the latter have the cephalo-thorax articulated, and breathe by tracheæ only; but *Philodromus*, though a smaller, is a nobler being, having his abdomen and cephalothorax distinct but unarticulated, and, possessing pulmonary sacs as well as tracheæ, is reckoned in the order *Pulmotrachearia;* his family are known as *Vagantes*, and he has a *genus* nearly all to himself. He is a good "object" for a tyro to try his hand, eyes, and temper upon: he is a delicate fellow to manipulate, and collapses into a mere shred upon the slightest provocation. Simmer him gently in liquor potassæ for a couple of minutes to make him transparent, and then with infinite pains and patience transfer him to a drop of glycerine for examination.

In Fig. 254 I present the reader with a dorsal view, displaying only those details that are made plain with the "inch-and-a-half" object-glass, the actual figure being enlarged to 180 diameters; the limbs are extended; the mouth is seen with the approximate maxilla flanked on either side by a three-jointed palp bearing a terminal brush of bristles.

Fig. 255, drawn from the microscope with the "quarter-inch" and B eye-piece, represents a lateral view of one of the legs, all of which are similarly constructed: the last joint is very minute, bearing in front and above two delicate little hooks or claws and a pad so far exserted as to be in some way opposable to the hooks. But the most interesting point of structure observable in this curious little foot is that the claws, when not needed as anchors to hold on by, are thrown up into a recess in the large penultimate segment evidently intended for

their reception, just as the claws of the lion are retracted during progression, the same muscles and mechanical principles being called into play to fulfil the purposes of this almost invisible parasite as are applied to enable the terrible king of beasts to accomplish the ends for which he was created.

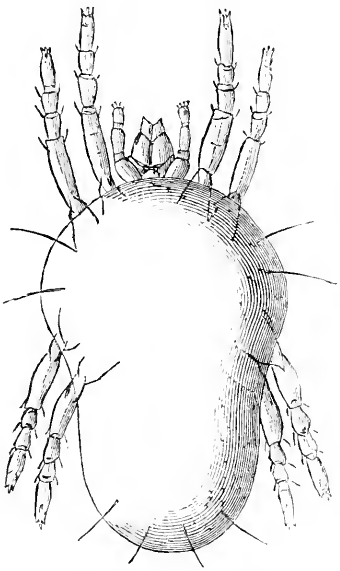


Fig. 254. Slug Parasite, × 180.

Fig. 256 shows the foot when the claws are thus thrown back in reserve, ready in a moment to come down, one on either side of the pad, and insure a firm hold on the slimy epithelium of Limax.

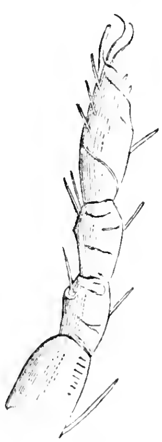


Fig. 255, × 450.

Fig. 256, × 450.

He has no eyes: "the parasitic mites are entirely deficient in these organs," says Siebold, "but are provided with a very delicate sense of touch both in the palpi and in the feet." The same distinguished naturalist—coinciding with Latreille—states that the whole class Arachnoidæ have no true mandibles, the organs commonly so called being "antennæ metamorphosed into prehensile and masticatory parts, since the nerves of those organs do not arise from the abdominal ganglia, but directly from the brain, as those of the antennæ of Crustacea and Insecta."

After a great expenditure of patience, and much manœuvring with light, we at last succeed in getting a satisfactory "definition" of the œsophagus, the five digestive cœca, and the intestine terminating in the under side of the abdomen: placed in the focus of concentrated rays collected from a Bockett lamp by a parabolic illuminator, the swift atom shines out from the darkness like glittering crystal, while the piercing light, aiding "penetration," enables the magic glasses to bring out the tracheæ and air-saks, and to fathom the recesses of bags and tubes. We cannot make out the heart and blood-vessels; the world-famed German above quoted pronounces that both are absent,—"There is therefore no regular circulation, but the nutritive fluid fills all the interstices of the body, and, by aid of the muscular movements and the contractions of the intestinal canal, is transferred in an irregular manner hither and thither in the visceral cavity and in the extremities." It may seem presumptuous to question this very decided dictum, yet I am bold to hazard the remark that, in my very humble opinion the entire absence of both heart and blood-vessels in a creature of such high and complex organization is opposed to all analogy, and I venture to express my belief that in due course of time, with the ever improving instruments and means of examination, some invincible pursuer of Nature's unrevealed secrets will discover and delineate for us either a heart or an articulated dorsal-vessel even in the tiny Philodromus Limacum.

Bury Cross, Gosport. J. Y. H.

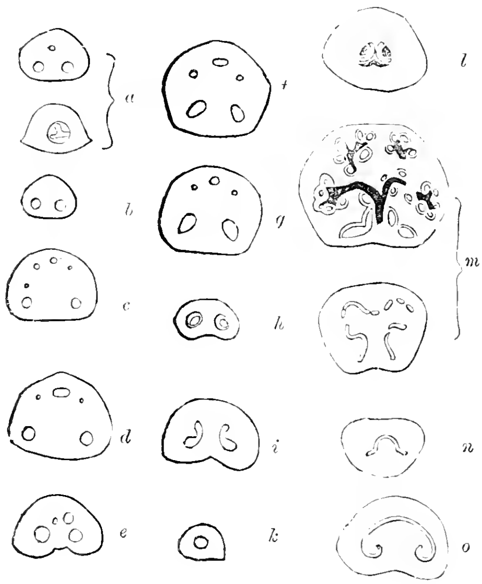
SCALARIFORM TISSUE.

THE arrangement of the scalariform tissue in the rachis of ferns presents us with several points of interest. In the first place, the scalariform tissue itself seems to be formed by a *spiral* thickening of the walls of the vessels, leaving regular elongated spaces not so thickly covered with the secondary deposit; for the vessels occasionally break up into spiral ribbons (fig. 257 *p.*) Then, not only each genus, but each species, seems to have its own peculiar arrangement of tissue; so that it seems possible from a mere section of the stem to determine the genus, and even the species of a fern.

The accompanying figures represent slightly magnified sections of fourteen of the more common ferns. It will be seen at a glance how different the

arrangement is in genera which are widely separated, and how similar it is in the several species of each genus, and in genera which are closely allied.

The tissue is generally gathered into two principal, and one or more secondary bundles; though sometimes the principal bundles are fused into one. Thus *Polypodium vulgare* has two principal and one small secondary bundle (*a*). These as they approach the leafy portion of the frond are fused into one bundle of three projections. In *P. dryopteris*



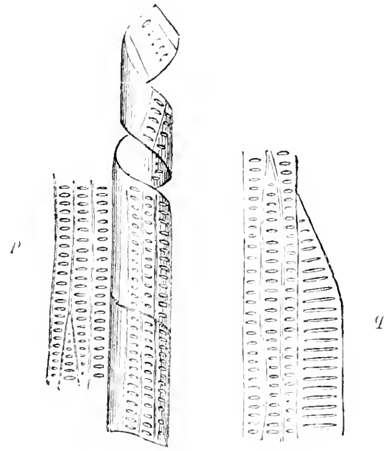


Fig. 257. Scalariform tissue.

the smaller bundle disappears (*b*). *Lastrea filix-mas* (*c*) contains two principal, three secondary, and a small bundle on one side only; all these bundles being circular. *L. dilatata* (*d*) has the same arrangement, without the small bundle, and the middle secondary bundle is oval. There are in *L. fœnisecii* (*e*) only two secondary bundles. In *Polystichum lobatum* (*f*) the principal bundles are oval, as well as the middle secondary. *P. angulare* (*g*) differs very little from this, except that the principals are ovate and the middle one round. *Cystopteris dentata* (*h*) has two reniform bundles. Those of *Athyrium filix-fœmina* (*i*) are somewhat similar, the primary and secondary bundles on each side seeming to be fused together. In *Asplenium trichomanes* (*k*) there is but one bundle, which is circular. In *Scolopendrium vulgare* (*l*) the bundles are semicircular, and joined back to back near their upper cusps. The bundles of *Pteris aquilina* are curiously disposed so as to form with the brown tissue the figure of a tree (*m*). The lower figure is a section across one of the branches of the frond, and shows the tissue more regularly disposed. The bundles of *Adiantum capillus Veneris* are fused so as to be saddle-shaped (*n*); and of *Osmunda regalis* so as to be semicircular, with the cusps turned in (*o*.)

I have not had an opportunity of examining any other native ferns. Others of your readers may be able perhaps to complete the series.

J. S. TUTE.

RARE VISITORS AT BRIGHTON.

WHILE Woolwich has been painfully visited by the so-called mosquito, we, in the, by courtesy, "Prince of Watering-places," have, during this extraordinary summer, been favoured by the presence of sundry rare Lepidoptera; while some kinds which in ordinary years have been but sparsely seen, have this summer been abundant, and others, apparently astonished at the unusual state of things, have produced double broods.

First among rarities stands that great prize to the entomologist, the Clifton Nonpareil (*Catocala Fraxini*), which well deserves the name Catocala—"beautiful beneath;" for its lilac-coloured anterior wings are certainly very beautiful. This specimen was caught by a page-boy in one of the hotels, and taken alive in a box to Swaysland, of Queen's Road, by whom it has been sold, to enrich the collection of Mr. Bond.

Next came a couple of Striped Hawk-moths (*Deilephila Livornica*), one of which was taken on the door of an outbuilding belonging to an eating-house in Church Street, and the other at a baker's shop in Edward Street. Both these, when taken to Swaysland, were in a very much worn and battered condition. In addition to these might be mentioned two peculiar catches, viz., a very fine Death's-head Hawk-moth (*Acherontia Atropos*) in good condition, and a battered specimen of *Sphinx*

Convolvuli (Convolvulus Hawk-moth) caught at sea. This circumstance might raise the question as to how far any of the swift-flying and powerful moths above enumerated were of English origin, and whether they had not flown from the French coast. Examples of the Small Elephant Hawk-moth (*Chærocampa porcellus*) have been taken in the streets of Brighton, and the larvæ have been most abundant in favourable localities. Not only were the Humming-bird Hawk-moths (*Macroglossa stellatarum*) very abundant in May and June, but they are at the present time to be seen everywhere in the gardens. The larvæ were so plentiful that thousands might have been obtained wherever their favourite food, in this locality—the Yellow Bedstraw (*Galium verum*)—was to be found. Another larva *literally* abounded on the poplars in and around the town, viz., that of the Puss Moth (*Cerura vinula*), a caterpillar which, from its peculiar form and threatening aspect, has at times inspired the vulgar with notions of its power of working ill, a country newspaper once describing it as "a monster, with head like a lion, jaws like a shark, a horn like a unicorn, and two tremendous stings in its tail." Feeding on the same tree with some Puss Moth larvæ, was obtained a solitary specimen of the *Cerura bifida*. This, as might be expected, has passed through all its changes, and has come out a female. On a lamp near the tree from which this larva was taken, some years since a female of *Cerura bifida* was caught.

Turning to the "Blues," not only have the Bedford Blue (*Lycæna Alsus*) and Chalk-hill Blue (*L. Corydon*) been plentiful, but *L. Adonis* (Clifden Blue) and *L. Alexis* (the Common Blue) have swarmed in favourable localities. Several very curious varieties of Blues have been taken, which appear to make for Darwin's theory. Never, perhaps, before have there been such swarms of the Clouded Yellow (*Colias Edusa*), while the Pale Clouded Yellow (*Colias Hyale*) has been almost as abundant as the former is in ordinary years; in fact, one hears of thirty, forty, sixty, and even as many as two hundred specimens being taken by different individuals, while many examples of *Colias Helice* have also been obtained.

I said the unusual weather had produced a strange state of things among some insects. Thus the Poplar Hawk-moths (*Smerinthus Populi*) and Privet Hawk-moths (*Sphinx Ligustri*) have come out from this year's pupæ. In one case five of the first-named, which had only gone to pupa ten days before, came out; in several other cases solitary examples, fed along with others, which have as yet shown no signs of change, after being about ten days in the pupa, have emerged, and, in the case of females, laid eggs. The common silkworms' eggs have also, in some cases, hatched about fourteen days after being laid.

A circumstance mentioned by one of your correspondents, respecting the prevalence of Whites, has had its counterpart; for I was so startled by a peculiar appearance in a market-garden as to walk a quarter of a mile to find out what was the cause, and found it was thousands of Whites hovering over a large bed of lavender. But while the Whites and their larvæ have swarmed, to the destruction of almost every green thing, their enemies, the Ichneumons, have also been abundant, as evidenced by the cocoons found alongside larvæ which have not turned to pupæ. The last Clifden Nonpareil taken here was caught about five years back, by a boy, on a scaffolding-pole.

Brighton. T. W. Wonfor.

P.S.—Since writing the above, several specimens of *Sphinx convolvuli* (Unicorn Hawk-moth) and *Metopsilus celerio* (Sharp-winged Hawk-moth) have been taken here, four of the latter in a garden about 200 yards from my house, and over a bed of verbenas. T. W. Wonfor.

ZOOLOGY.

Euthemonia russula. — Last June I was fortunate enough to find a female of the beautiful clouded buff moth (*Euthemonia russula*), the male of which being tolerably plentiful at one place on the moor near this place, but the female being rarely seen, I brought it home with me, and it deposited a few eggs, which hatched in ten days, and the little caterpillars all grew very rapidly (excepting three). They attained their full size about the beginning of August, and spun their cocoons, and the moths came off about the middle of the month, thus being two broods in one season. The three caterpillars which did not spin up remain only about half grown.—*A. M., Wolsingham.*

Nest of Crossbill (*Loxia curvirostra*).—A nest of this species is now in my possession, taken beginning of last June in this county, four miles from Bedford. As I have not met with any authentic account of its breeding in this country, I will give the particulars. The nest was situated in the fork of a lime-tree, about nine feet from the ground. It is very rudely constructed, and as it lays before me it has not much the appearance of a nest. On inspection it is composed of grass, moss, roots, twigs, and leaves. The eggs were three in number, of a purplish tinge, streaked and blotched at the large end with dark purple-red, showing a strong resemblance to those of the greenfinch. The old bird was distinctly seen; in fact it was her flying off the nest that attracted our attention to it.—*J. Shelton, Bedford.*

Gold-fish Fins.—While watching, a short time ago, the movements of the occupants of a large aquarium belonging to a friend, I noticed something

abnormal in the caudal fin of one of the gold-fish. On closer examination, I found that the fin, instead of being homocercal, has part of the under lobe cut off, as it were, while another] fin, similar to the caudal, but bent in an ungulate form, is attached to its lower edge, giving it a strange and rather awkward appearance. The accompanying sketch will perhaps be more descriptive than letter-press. This fish, like many more, has the slight boss in place of the dorsal fin as described by "W. H. D." in last month's Science-Gossip, and the anal is malformed.—*S. Morris.*

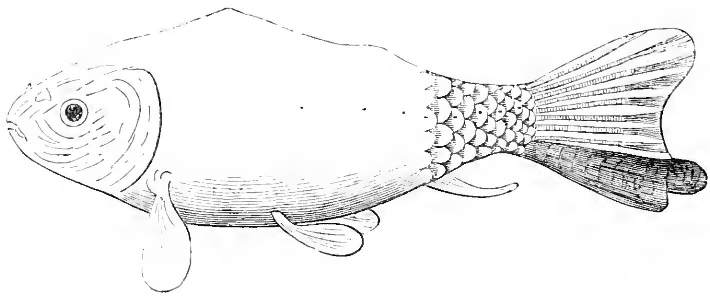


Fig. 258. Monstrosity in Gold Fish.

Portuguese Man-of-War.—Looking through Vol. III. of Science-Gossip, I was struck by a remark of Mr. P. H. Gosse, F.R.S., at page 184, that "the injection of a poisonous fluid" from the stinging weapons of the Portuguese Man-of-War "is rather a plausible inference than a matter of sensible observation." It reminded me of an incident that occurred to me while bathing, about a month ago, in Augusta Bay, Sicily. A very large specimen of the Portuguese Man-of-War was floating alongside of the ship. We caught it in a bucket, in which it lay exposing the whole surface of its gelatinous disc above water. I moved it about with my finger, taking care only to touch the bladdery part, and, having finished a short inspection, returned it to the sea. Having done this, I unconsciously put the same hand to my nose and face. In a few minutes the part I had touched became red and swelled, and I experienced the horrible irritating pain that one feels when "stung" by coming in contact with the common sea-nettle (*Cyanea capitata*)—a sensation to which I am no stranger after four years' constant bathing in the harbours of the Mediterranean. I have troubled you with this little incident, as I fancy it rather supports Mr. Bennett's statement (quoted at page 161, vol. iii.), which Mr. Gosse appears to doubt, that the "sting" of this Physalia is occasioned by the discharge of an acrid juice (with or without the penetration of any barbs), which would seem to be emitted, not only from its tentacula, but from the whole surface of its body. I would also mention that two small fish escaped from among the tentacula of my Physalia, but were overboard before I could secure or identify them.—*W. Wykeham Perry, H. M. S. "Caledonia," Naples, 14th October*, 1868.

Your correspondent, Mr. Perry, has not observed that I was speaking with the cautious precision needful in stating scientific facts. My animadversion on Mr. Bennett's remark was on the circumstance that he *asserts* what (though in the highest degree *probable*) is *not yet proven* by actual optical evidence, viz., the injection of a fluid. Mr. Perry imagines that I *doubt* the discharge of this fluid; but I do not, *morally;* yet I say again, it rests on inference rather than actual observation. Mr. Perry does not add an item, not an iota of evidence on this point. We had *before* abundant proof that contact with the Physalia produces severe irritation of the skin, and many of the symptoms of irritant poisoning; and he goes no farther than this. If he had consulted my "List of Sea-anemones (loc. cit.)," he would have seen that I have gone not only thus far, but much farther, in adducing grounds for believing that the symptoms are due to an injected poison. But still I *believe* it merely, I cannot *assert* it. Some excellent observers seem unable to apprehend the nature or the need of precision in language.—*P. H. Gosse.*

The Heart of Daphnia.—Since the publication of the article on this subject in the October number of Science-Gossip, I have seen a work on the Daphniadæ by Dr. Franz Leydig, in which the "slit-apertures" (*Spaltöffnungen*) or "side-slits" (*Seitenspalten*) are described and figured. The monograph was published at Tübingen in 1860. This fact at once disposes of any claim on my part to being the first observer of the heart-action of Daphnia. In making this acknowledgment, I have still the satisfaction to find that my observation of the organ and its homology, as well as the general view I have given of the circulation, although in entire ignorance of Dr. Leydig's work, exactly coincides with the carefully elaborated description to be found in his chapter on the circulation of Daphnia.—*H. C. Richter, Kensington.*

Gill of Sword-fish.—The outer, or epidermal layer of the gills of the Sword-fish, is punctured with lines of rounded or elliptical pores or openings.

Each of these is surrounded by delicate short cilia, which project into the openings. When mounted as an opaque object, and seen with a 2-inch or 1½-inch objective, it is very attractive. Or the layer may be removed with a sharp knife, and mounted in balsam. A slide mounted in the former manner was exhibited at a recent meeting of the Quekett Microscopical Club, and attracted considerable attention. It promises to be a good stock object, at first sight resembling a section of sponge, with the spicules *in situ*.

Melanism in Xylophasia polyodon.—Whilst "sugaring" for Noctuæ last June, in a plantation at Wallasey, Cheshire, I captured a specimen of this most abundant moth, which appeared to bear the same relation to the typical form as *Argynnis valezina* does to *A. paphia*. The forewings were completely black, the usual markings appearing very indistinct; and it completely agreed with the description and figure in p. 285 of "Newman's British Moths." Mr. Newman there observes that he is not aware whether this state of melanism is common in that species, but that he has received specimens collected by Mr. Birchall from Scotland. I conclude, therefore, that in England at least it is somewhat of a rarity.—*J. C. Melvill, November 10th*, 1868.

Repaired Fossil Ribs.—Among the numerous fossil specimens I have recently obtained from the shale of the Low Main coal-seam, Northumberland, are several ribs of fishes and reptiles, some of which present the comparatively unusual phenomenon of having been broken and repaired within the bodies of the animals to which they belonged. There are several broken in one place that have undergone repair, but two specimens on the same piece of shell, about four inches in length, have been broken and repaired, one in but one place, and the other in four places. Where the repairs have taken place the bones present the usual appearance of bulging, caused by the throwing out of osseous matter for the restoration and continuity of the broken bones. We have in these examples a very beautiful illustration of the existence of the law of fracture and natural restoration in the animals of the carboniferous era, such as is daily operating in existing animals. I desire that the readers of Science-Gossip will send to me for carboniferous fossils, without any apprehension of exhausting either my stores or patience. The duplicates increase upon me so rapidly that I must either give them away freely or throw them away. Any reader of Science-Gossip can have forwarded to his address about four ounces of carboniferous fossils, if he will send to me an ordinary perforated luggage label bearing his address, and two postage stamps. I shall be able for the two stamps to send specimens per sample post.—*T. P. Barkas, Newcastle-on-Tyne.*

BOTANY.

Wild Pansy.—I found yesterday (Nov. 10), in a turnip-field near Wycombe, an unusually fine specimen of *Viola tricolor*. The central stem was erect, and from the axils of the leaves, whence the flowers usually proceed, grew branches with two or three flowers on each. Besides this central stem, there were at least a dozen procumbent branches of great length, forming a patch, which, at its widest part, measured 26 inches across. The blossoms were much larger than usual, almost as large as those of *V. cornuta;* one or two had their two upper petals faintly tinged with blue, but the remainder had the four upper petals cream-colour, and the lowermost deep yellow in the centre, fading away to straw-colour. There must have been at least fifty open flowers on the plant, the branches of which would doubtless considerably increase in size before fading. I remarked that the blossoms were very sweet-scented, a peculiarity I do not before remember to have noticed in this species.—*B.*

The Wood Sorrel (*Oxalis acetosella*).—In my paper on the Wood sorrel in the March number of Science-Gossip I spoke of the "white, pearly-looking seeds," and their mode of distribution. As this was subsequently repeated in *Aunt Judy's Magazine*, and as my friend Mr. Holland has shown me that it was erroneous, I feel bound to supplement my remarks by the following note, which I give in Mr. Holland's own words:—"The arrangement in *Oxalis* is as follows. The calyx is persistent, which matters nothing; the fruit consists of a five-celled ovary, which opens with five valves (slits); the seeds are attached to a central column. In *O. acetosella* there is only one seed in each cell; in *O. corniculata* and *O. stricta* there are many seeds. They are brown, and beautifully corrugated, looking, when magnified, like peach-stones. Each seed is contained in a white pocket, which, when ripe, suddenly turns inside out, expelling the seed with considerable force, and detaching itself at the same time from the placenta. Lindley calls this pocket a white *integument*. This is wrong, and apt to mislead. The brown skin of the seed is the *integument;* the white pocket will, I am pretty sure, be found to be an *arillus*, or extension of the funiculus."—*B.*

Stratiotes aloïdes (*L.*) in the North.—In most botanical works the south-eastern counties *alone*, such as Cambridge and Norfolk, are given as localities for this curious aquatic. I found it, however, in some plenty in a pond at Silverdale, North Lancashire, this summer, flowering profusely, and Mr. R. Holland tells me it is not uncommon in Cheshire; so its distribution is evidently more general than our Floras would lead us to suppose.—*J. C. Melvill.*

NOTES AND QUERIES.

Insects at Folkestone.—It may interest your readers to know that about the middle of August last I took in lucerne fields at Folkestone in three days seven specimens of *Colias hyale*. I refrained from taking more, as I might have done, as I did not wish uselessly to keep down the species, but on looking at my specimens afterwards, I found that no two were, even at first sight, quite alike. On a bank just out of Folkestone, along the Dover Road, I took at the same time a very beautiful and perfect specimen of *P. Adonis*, measuring only *nine and a half lines* across the wings. The ordinary size of the species according to Stainton is one inch two lines to one inch four lines. This is now in the British Museum, where it may be seen on application to one of Dr. Gray's assistants. About a week afterwards I took at a field in Bolney parish, near Cuckfield, Sussex, a butterfly which very closely resembles *C. helice*, which I hope it may prove to be.—*Basil G. Greenfield*.

Crane Fly Swarms.—In the latter end of September the crane flies were so numerous in Victoria Park that they were positively troublesome, flying into people's faces. The walks, &c., were besprinkled with them; in some cases the tops of the tents were one mass of them, and it was really amusing at times to witness their grotesque antics on the points of the tents as they danced and capered backwards and forwards up and down.—*G. Bullard*.

Spider Bites.—I am quite certain that the large specimens both of *Tegenaria* and of *Epeira* are quite capable of piercing the human skin, for I have experimented carefully upon them; and I think that those persons who dispute it, either have not been able to make the spiders put out their falces properly, or have applied them to the most insensible part of their hands. I generally find that if I succeed in procuring a tolerably large tegenaria without injuring it, it will instantly open its falces to their greatest extent and bury them in the skin. Upon removing the creature, a minute drop of blood appears, a tingling sensation, and a white swelling commences, not unlike that produced by a stinging-nettle. This is undoubtedly produced by the poison left in the wound. And if the person who is bitten is in bad health the consequences *might* be somewhat serious. The occurrence that your correspondent, "R. H. N. B.," mentioned, was perhaps due to the same cause (*vide* Science-Gossip, p. 189). I do not wish to put forth these statements of mine as sweeping conclusions, but I am of opinion that ninety-nine persons out of a hundred would *feel* the bites.—*A. B.*

Amber. — The dredging establishment near Schwarzort, on the Curish Haff, produced about 83,600 lbs. of amber in the course of the year 1867. In the two previous years the quantities obtained were as follows, viz.:—in 1865, 53,000 lbs.; and in 1866, 73,000 lbs. The amber trade during the year was not very flourishing. The expectation that the business with England would become more important has not been fulfilled. It is most probable that the large quantities of imitated amber which are brought to the English and Asiatic markets, and the price of which is much lower than that of the genuine article, causes the demand from Prussia to be so small.

A Phenomenon.—If J. Thorpe would make a microscopic examination of the *blue* wings of the butterfly described by him in the last number of Science-Gossip, he would help to unravel a physiological puzzle. If the insect be a double sexed one, the *blue* wings ought to show what microscopists call "battledore" scales; these are on the upper surface, beneath the ordinary scales, and at the intervals, but if, on the other hand, it is but a case of the female imitating the male markings, then I should not expect the peculiar *male* scales would be present. I have a singular form of *Lycæna Corydon* (Chalk Hill blue), taken here this summer, in which the hind wings have the blue male markings, while the fore wings are the ordinary brown female ones. I cannot on the blue wings trace "battledores," and consequently consider it a case of a female imitating the male markings only. I have for years waited to examine or know the result of the examination of a form like that mentioned by J. T.—*T. W. Wonfor, Brighton.*

"Devonshire Ferns" (Science-Gossip, October, p. 238).—I found in the fissures of the rocks above Auste's Cove, near Torquay, in August last, nice specimens of *Asplenium Ceterach*, *Trichomanes*, and *Ruta muraria*, with *Blechnum spicant* in tolerable quantities. With regard to the occurrence of *Osmunda regalis*, in Cornwall, very finest specimens were those I saw on the outskirts of Degibria Wood, on the east side of the Loe Pool; here, too, *Corigiola littoralis* was very abundant; *Chenopodium polyspermum* somewhat sparingly distributed. My specimens of *Erica vagans* were not obtained from this wood, but from a wood on the west side of the Pool. Specimens of *Osmunda* on Marazian marsh were diminutive. A great number of fronds of *Asplenium lanceolatum* (near Penzance) were bifurcated. Some frond I have is repeatedly divided.—*R. T., M.A.*

Red Daddy.—Allow me, through the medium of your interesting journal, to call attention from your readers to a little ferocious insect of the Gnat tribe, which has, during the past summer months, frequented this locality; viz., the "Red Daddy." This insect, about the size of a large gnat, has a body, in length about three quarters of an inch; in colour red. The shape towards the head is oval. This suddenly breaks off into a long tapering tail, the end of which is furnished with a pair of tweezer-shaped weapons (I must however add that from the crown of the head, just above the eyes, spring two long whip-shaped objects). This insect has the power of biting from the mouth and stinging acutely from the tail; the bite of the former becoming fastened upon a handkerchief is with difficulty removed. I have examined the last named weapon (the tweezers) under a microscope, and find they have the power of parting and closing like the common earwig. I learn this to be an English insect, rare in its visits to this country. No doubt, like the Humming Bird Moth, the intense heat of the past summer proved the attraction, for I have seen no more of them, I am glad to say, since the arrival of the cool weather.—*J. Elphick, Rose Hill, Dorking.*

Lythrum hyssopifolium (S. S.).—I have specimens of this plant found at Barton Mere, near Bury St. Edmunds. In the new issue of "English Botany" this plant is stated to be "very rare," and a few localities are given in which it has been found; but neither Prestwich named by "S. S." or the place given above, are included.—*J. T.*

The Tui or Parson-bird.—During the three years I was travelling in New Zealand, I had many opportunities of carefully watching the habits of this peculiar bird. I shot many of them, and in preparing the skins, I generally found the food consisted of berries, particularly the Poro-poro berry. Your correspondent, "T. P. Barkas," April number of Science-Gossip, is in error in stating this bird feeds upon mollusca. I have walked many miles along the coast, and I never remember to have seen this bird feeding on the sea shore; the bird whose peculiarities are described by "T. P. B.," is the Kororo, a species of the small green Penguin. I have often watched these birds in search of food; as the tide recedes, numbers of Bivalves, called Pipis, are left upon the beach. They are very similar to our cockles, and for reasons I am unable to explain, the shells are frequently wide open; the crafty Kororo drops in a small stone, which effectually prevents the Pipi from entirely closing the shell, and the poor mollusca falls an easy prey to this expert fisher.—*Wm. Johnston.*

Clouded Yellow.—Having observed in the November number of Science-Gossip H. H. O'Farrell's inquiry relative to the Clouded Yellows, I beg to inform him that during the last week in August, 1867, I caught fourteen (male and female) Clouded Yellows and a pale Clouded Yellow (*Colias hyale*) on the Tottenham and Hampstead Ryes, and fields adjoining near Dalston.—*G. H. Conquest.*

Clouded Yellows.—A friend of mine at Henley on Thames, has found the clouded yellow scarce this summer. But the pale coloured yellow very plentiful; also, white letter hair streaks, and chalk blues. He has also taken a few silver-spotted blues. Last summer the clouded yellow was very common in Oxford and Henley-on-Thames, and pale clouded yellow very scarce.—*B. B. Scott.*

Acorns as Food for Fowls.—Do acorns discolour the yolks of eggs? I heard it asserted that they turn them black. I never gave my fowls any acorns, but I was staying last month at a house in Hants where a large number of poultry were kept, and seeing some bags full of acorns in the farm yard I said "Collecting for your pigs?" "No! for the fowls," was the reply; "we crack the acorns and mix them with meal; the hens are very fond of them." On asking if this mixture did not affect the eggs in colour and taste, I was well laughed at, but I have since been informed, and I have also read it in a poultry chronicle, that acorns will discolour eggs.—*Helen E. Watney.*

Luminous Worm.—On 20th of September and the 18th of October, at night, I saw on the ground a luminous spot, similar in size and appearance to the light of a glowworm, the cause of which at first I could not discover. On dividing it with the edge of my boot, a part ran about giving a brighter light. The next time I saw the phenomenon, I picked it up and carried it to the light, when I found an insect much like what is commonly called the "wire worm," and which I enclose for your inspection. Its luminousness, which was confined to a *fractured* part of the insect, disappeared after being in my hand about five minutes. Was the luminousness caused by the fracture, or does the insect naturally emit a light? Whatever it was, it adhered to my fingers like any other phosphorous matter.—*G. J. Dew, Lower Heyford.*

[The enclosure was a centipede.—Ed.]

Ants, Ants.—At page 213 of your September number is a query from "H. F. M." about the destruction of ants. Having been frequently annoyed with them during my residence in India, I am happy to say I can suggest a remedy for the total destruction of all the ants that may venture into the house or larder of "H. F. M.," and that is, to tell the cook to take the *fresh and fine heated ashes from the kitchen grate*, and to sprinkle some over the ants whenever they appear. They will be destroyed by the *heat* of the ashes. I have seen this frequently and successfully tried during my stay in India. The ashes must not be red hot, otherwise mischief may be caused to the flooring of the room. Our houses in India are infested with white, red, and black ants. The white ants eat large holes through books. I now possess a book which has been nearly drilled through by them. The red and black ants eat up any cold meat on the table so that it becomes more necessary to destroy them than it would be in this country.—*A. Wyndham, Lieut.-Colonel, late Madras Army.*

October Lilac.—Frequent observation has been made of unusual phenomena resulting from the protracted summer which has marked the present year. Permit me to add one instance more. On the 11th of October I saw, at Ovingdean, near Brighton, a white lilac tree, whose terminal shoots were crowned with fresh blossoms, while the stems, already leafless, told only of the waning year.—*Alfred Haward, Shirley Villas, Croydon.*

Colias hyale.—I can mention a still more unusual occurrence "in the suburbs of London" than does your correspondent H. H. O'Farrel, being that of *C. hyale* in Battersea Park, on the 12th of this month. It was apparently in capital condition as to plumage, but weak on the wing. I had no net with me, and could not capture it, though I startled the passers by with frantic attempts with a wideawake.—*W. E. Hambrough.*

I possess a specimen of the variety of *V. urticæ* with confluent markings, exactly as figured in Westwood and Humphreys' work, and taken in Northamptonshire. May I be informed whether there are many such existing in cabinets?

Dendritic Spots on Paper.—The following remarks on these curious spots appeared in a recent number of the *Gardener's Chronicle*:—"The spot on paper is a doubtful plant, named by Agardh and Lyngbye *Conferva dendritica*. It is perhaps some chemical production, but, if not, a fungus, and not an alga. Schumacher called it *Dematium olivaceum*, making it a fungus.—*M. J. B.*, in *Gardener's Chronicle*, Oct. 17, 1868.—Fragments of paper containing these bodies have been sent us several times for identification. An experienced analytic chemist on one occasion when we submitted examples to him, ventured the suggestion that they might be crystals of iron pyrites, but he did not verify the supposition by chemical test."

Swallows in November.—The late stay and appearance of migratory birds is, I believe, a subject of interest to ornithologists. I therefore acquaint you with the fact that four swallows were seen by me actively hawking about for insects last Sunday up and down a terrace facing the sea. Where had they been all the cold weather till *brought out* by the warm sunshine of that day? Supposing a continued hard season had set in, what would have become of these late-staying birds?—*W. Hambrough, Worthing, Nov. 11th, 1868.*

Telling the Bees.—Is there any foundation for the country superstition of tapping at bee-hives upon the death of their owner, in order to prevent them forsaking the hives? I am acquainted with a case which has happened lately, where the bees—some days after the death of their owner, a country gentleman—have entirely deserted their hives, which had not been so "tapped." Or, can it be that this circumstance is attributable to a natural habit of desertion at certain times, and therefore merely a curious coincidence, which has given rise to this popular superstition? Perhaps some of your readers will kindly enlighten me.—*H. T. R.*

Rats in Summer.—Can you or any of your numerous readers inform me whether they have observed any effect on the habits of the rat during the recent dry summer? It is well known that the rat will not live long without water, and during this summer, when nearly every pond and rivulet were dried up, and no dews falling at night, where could they get a supply?—*R. Y. G.*

Pupa of Dragon-fly.—I believe that Mr. Pollock's insect was *Anax formosa*, as it is the only British Dragon-fly that will answer to his few words of description, and moreover the time of its appearance in the perfect state was too early for the large true Æschnas.—*R. McL.*

Horse Chestnut.—Have you ever noticed that at every branch, or I should say joint in the branches, of this tree there is a most perfect resemblance to a horse's foot? Fetlock, hoof, shoe, and nails, are all to be traced. It is exceedingly curious, and I was told a few days since that this portrayal of the animal's foot is the true origin of the name. I had always imagined, as I have often seen it written, that the generic name, *Æsculus Hippocastanum*, was derived from *Esca* food, and that *Hippocastanum* was a compound of the Greek for a horse and a chestnut, because horses eat the fruit readily. Can you tell me which is the right version?—*Helen E. Watney.*

Spider Suspending a Stone.—The account in your last number of Science-Gossip of the spider's web with the stone suspended from it, reminds me of a similar case observed by my sister in Scotland. She was walking through a wood, when suddenly she noticed, at some distance from the ground, a small stone, apparently in mid-air, but which on closer examination was seen to be suspended by a long thread from a spider's web built between two trees. I have since often been puzzled as to the object of the stone's presence, and I am much interested to find that the case is not unique.—*J. F. D.*

Museum Curiosities.—I was lately visiting in a large town in the north of England, celebrated for its museum of geological and antiquarian curiosities. While walking round the different rooms filled with these wonders I was accosted by an elderly man, who apparently had the office of keeper, and general attendant on the visitors who might chance to go over the museum. Naturally wishing to gain information, I put a question to him relative to the finding of some huge Saurian monster I was looking at. "You perhaps are not aware, sir," he said, "how these creatures got into the rocks where they are found. Now, we read in Bible history that there were great convulsions of the earth, that the rocks were rent, and a great flood covered the face of the ground. Then it was that these creatures *got washed into the cracks*, and so we dig them out now." Thinking your paper may fall into the hands of those who superintend museums, I venture to lay this story before the public, both as a caution, and I hope a warning. To allow such subordinates even to dust the cases of museums is, to my mind, a connivance at flagrant desecration, not only of the specimens themselves, but of their scientific history. Surely some little education is needed!—*LL. B.*

Why are many animals attracted by light? Insects are especially so attracted. Witness the invariable attempts of many kinds of moths to commit suicide by plunging into a flame. That fish are so attracted, poachers well know. Birds will singe their wings against a lighted candle. Winged mammals, if we may so call a bat, will do the same. Why is this?—*John Hopkinson.*

Spider's Maternal Affection.—In this month's Science-Gossip there is an article upon "Spider's Maternal Affection," for the truth of which I can fully vouch, as I have repeatedly tested it, and seen it tested by others. I am not aware that there is more than one species of spider that thus acts towards its offspring, and that is rather large, and the bag of a yellowish grey. There is one habit of the spider that I do not recollect seeing mentioned in Science-Gossip, and that is the habit of feigning death when handled. It turns over on its back, curls up its claws, and will permit itself to be handled and rolled about—nay, even to be dropped to the ground—without the slightest indication of life, until it seems to think itself unobserved, and then it suddenly starts up and away.—*G. B.*

Ailanthus Moth (p. 263).—The *Bombyx mori* (the moth to which the common silkworm turns) hatches in this country early in May. In July the caterpillar arrives at maturity, and spins its cocoon, remaining in the pupa state for two or three weeks, when it bursts its case and comes out as a perfect insect. The female then lays its eggs, and dies almost immediately. The *Bombyx cynthia*, or Ailanthus Moth, on the contrary, passes the winter in its cocoon, from which it emerges in the summer, lays its eggs, and dies. The eggs hatch in about two weeks; in four or five weeks the larva spins its cocoon, remaining usually in the pupa state until the following spring; but "if the caterpillars," says Mr. Tegetmeier, "are produced early in the year, there is time to raise two generations of moths during one season," the pupa changing into the imago state, and the female laying its eggs before the cold weather comes on. The cocoons of this second brood are said to be much smaller than those of the first. Continued hot weather will no doubt favour the same result as early hatching.—*John Hopkinson.*

Laurel Berries.—Can any practical botanist kindly inform me how it happens that a shrub, the leaves of which when bruised can emit fumes of prussic acid sufficiently strong to kill the largest moth, and from which also, when distilled, the "laurel-water" so renowned in cases of poisoning human beings has been obtained, can produce berries perfectly harmless in their nature? I can answer for their being eaten by handfuls off some old laurel-trees in our own orchard, and they are actually stolen and carried off by children as a rich feast from a neighbouring demesne where they abound.—*F. I. Battersby, Cromlyn, Rathowen, Co. West Meath, Ireland.*

NOTICES TO CORRESPONDENTS.

All communications relative to advertisements, post-office orders, and orders for the supply of this Journal, should be addressed to the Publisher. All contributions, books, and pamphlets for the Editor should be sent to 192, Piccadilly, London, W. To avoid disappointment, contributions should not be received later than the 15th of each month. *No notice whatever can be taken of communications which do not contain the name and address of the writer*, not necessarily for publication, if desired to be withheld. We do not undertake to answer any queries not specially connected with Natural History, in accordance with our acceptance of that term: nor can we answer queries which might be solved by the correspondent by an appeal to any elementary book on the subject. We are always prepared to accept queries of a critical nature, and to publish the replies, provided *some* of our readers, besides the querist, are likely to be interested in them.

L. R. R.—Your beetles are "*the* Weevil," i.e., the Corn-weevil (*populatque ingentem farris acervum Curculio*, Virg.). Their scientific name is *Sitophilus granarius*, Linn.; and, with a closely allied species, *S. oryzæ*, Linn., which occurs in rice, and is immediately recognisable by its four-spotted elytra, they represent in this country the destructive family *Calandridæ*, of which the gigantic exotic *Calandra palmarum*, the "Palm-weevil," may be considered the type. Both the species of *Sitophilus* above mentioned have become thoroughly domesticated in this country, having originally been introduced from abroad. They are, in fact, almost cosmopolitan. Independently of their usual habitat in granaries, bakeries, houses, &c., they sometimes occur at large in dry haystack refuse, and similar vegetable matter.—*E. C. R.*

W. W. S.—Your beetles are males of the common *Ptinus fur*, Linn., an insect allied to the "Death-watch" (*Anobium*), and found in houses. The female is shorter, more rounded, and with much shorter legs and antennæ, so that she might easily be considered by a novice to belong to a different species. When freshly disclosed from the pupal state, both sexes have four rather conspicuous patches of white scales on the wing-cases. This insect readily simulates death on being disturbed.—*E. C. R.*

What are Figs?—The swollen receptacles which enclose the numerous fruits of a great number of minute inconspicuous little flowers. If "J. S. C." will cut through a green fig just coming to maturity, he will discover by the aid of a lens the numerous minute flowers in the centre, the only access to which is by the small hole at the top of the fig. It is a very peculiar form of inflorescence. In popular language the fig is called a *fruit*, which is very much nearer the truth than "J. S. C.'s" suggestion that it is an excrescence.

E. C. B. (Maine).—*Sphagnum fimbriatum*.—*R. B.*

T. S.—The diatoms are *Odontidium mesodon* and *Fragilaria capucina*, common fresh-water species.—*F. K.*

E. W.—We know of none.

J. L.—We object to the course you suggest. Our advertising columns are the legitimate medium.

W. H. D.—The shells were *Lacuna crassior*, *Pupa marginata*, *Conovulus myosotis*, and *Cyliotina mamillata*.—*R.*

L. E. P.—Benzine.

H. O. V.—Did you never hear of "putting salt on their tails"?

Depositrs.—Two slides sent for exchange without name or address.

F. R. S.—Your MS. written on both sides of the paper and all kinds of subjects mingled together is useless for our purposes, as we do not employ an amanuensis.

J. B.—We do not suppose that any one can tell, at any rate we are unable.

J. C. M.—Not decided at present, probably not.

R. V. T.—No. 1. *Cyathus striatus*.

J. A. should read C. Darwin's paper on twining plants in the journal of the Linnæan Society.

E. G. W.—A catalogue of British Coleoptera, by G. R. Waterhouse, London, Taylor & Walton. Other correspondents have written of the unusual number of Albino varieties of birds this year.

W. L. H.—The most approved method is to arrange in cardboard boxes. You can get a list of British birds of E. Newman, Devonshire-street, Bishopsgate.

T. R.—A mass of prothallium with young plants, probably belonging to *Discelium nudum*.—*R. B.*

J. C. D.—No. 1. *Dicranella heteromalla*; No. 2. *Trichostomum rigidulum*.—*R. B.*

EXCHANGES.

Seeds of Lathæa Squamaria wanted in exchange for seeds of *Sturmia Loeselii*.—W. W. Reeves, Royal Microscopical Society, King's College, London.

Induction Coil, No. 2, with Bottle Battery, Commutator, and Discharge; and six Geissler's Vacuum Tubes (all good), to exchange for Micrascopic Slides.—E. G. Langholm Villas, Mostyn Road, Brixton, S.W.

British Marine Shells in exchange for British Land and Freshwater, especially the various varieties of *Unios* and *Anatontas*. The localities of all to be undoubted.—Send lists of desiderata and duplicate to W. White Walpole, Holmwood, Kingston-on-Thames, Surrey.

Local Plants, chiefly from the South of England, are offered in exchange for other Local Plants.—Address, James Irvine, 28, Upper Manor Street, Chelsea, London, S.W.

Elytron of Diamond Beetle (*Grammatophora marina*), and Scales of *Lepisina saccharina* (mounted), for other objects of interest.—W. W. Jones, 80, Queen's Road, Bayswater.

Microscopic Objects (unmounted, in exchange for Feathers of rare British Birds (named).—J. R. E., 19, Downshire Hill, Hampstead, N.W.

Pupæ of C. Elpenor, *N. Ziczac*, and *N. Dictæa* for other Pupæ, or British Lepidoptera. Send list.—Alfred Pickard, Wolsingham, Darlington.

Sections of Aristolochia Sipho, and Laburnum; Scales of Eleagnus and Sheperdia (mounted). for other Mounted Objects.—J. Carpenter, Waltham Cross, Herts.

For Pollen of Yucca (mounted), send Two Stamps and Address, J. Humphreys, Cheltenham Branch Dispensary.

Wanted in exchange for a Collection of Moths in Cabinet, a Slate Marine Aquarium, elegance no desideratum.—Address, F. J., 139, Maida Vale.

Nemeophila Plantagines, *Euthemonia Russula*, *Clostera reclusa*, or *Lasiocampa Rubi*, for other good British Lepidoptera or Pupæ.—Send list to A. Mitchell, Wolsingham, near Darlinton.

Hairs of Reindeer, Bat, Kangaroo, and other species (mounted) for unmounted objects of interest.—T. D. R., 26, Westbourne Park Villas, W.

For Specimen of Coralline, or Pike and Roach Scales, send stamped and directed envelope or any microscopic object to F. S., Post-office, Rugeley, Staffordshire.

Birds' Eggs, and Land and Freshwater Shells, for Pupæ of Lepidoptera or other shells of the same.—Thomas H. Hedworth, Dunston, Gateshead.

BOOKS RECEIVED.

"Scientific Opinion," Vol. I. Nos. 1, 2, and 3, Nov. 4th, 11th, and 18th, 1868. London: Charles Wyman.

"The Naturalist's Note-Book," No. 23, Nov. 1868. London: 196, Strand.

"The Naturalist's Circular," No. 30, Nov. 1868. London. Henry Hall.

"One Thousand Objects for the Microscope," by M. C. Cooke. With 500 Figures. London: F. Warne & Co.

"On Natural History as an Occupation for the Spare Time of Country Clergymen," by J. O. Westwood. Appendix from W. Bellair's "Church and School."

"The Dental Register," edited by J. Taft and G. Watt. Vol. XXIII. No. 10. Cincinnati: Wrightson & Co.

"Proceedings of the Essex Institute," Vol. V. No. 6, April May, June, 1867. Salem: April, 1868.

"Observations on Polyzoa, sub-order Phylactolæmata." With Nine Plates by Alpheus Hyatt. Salem: from the Proceedings of the Essex Institute.

"Annual Report of the Board of Regents of the Smithsonian Institution, 1866. Washington: 1867.

"Proceedings of the Bristol Naturalist's Society for September and October, 1868." 2nd edition.

"Appendix to the Manual of Mollusca of S. P. Woodward," by Ralph Tate, A.L.S. London: Virtue & Co.

Communications Received.—T. W. W.—W. G.—H. E. W.—W. W. P.—P. H. G.—H. C. R.—G. H. C.—E. G.—H. O. V.—E. W.—J. I.—R. Y. G.—W. E. H.—J. Y. H.—H. H.—W. W. W.—J. L.—H. T. R.—W. S.—J. E.—H. C. L.—J. S. T.—W. J. D.—T. T.—J. B. C.—R. E.—I. G.—J. C.—F. I. B.—J. R. E.—F. J.—A. M.—J. H.—B.—W. H.—J. H.—F. R. M—G. B.—W. W. J.—L. R. R.—E. G. W.—S. S.—H. C. L.—J. C. M.—A. H. E.—M. A. Mc.L.—R. G.—R. M. B.—J. B.—T. P. B.—F. R. S.—J. F. (thanks).—J. B. Cockan.—L.L.B.—J. S. C.—A. P.—R. V. T.—C. F.—W. M.—J. A.—E. G.W.—F. G. P.—C. W.—F. S.—W. M.—T. D. R.—W. L. H.—T. H. H.—S. J. McI.—C. W.—W. M. Dudley.

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